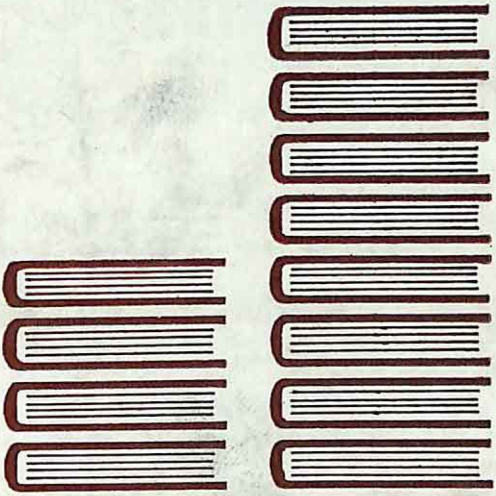
EDUCATION AND ECONOMIC GROWTH



D.R. VEENA

EDUCATION is an important factor in creating social order founded on the values of socio-economic justice, freedom and equal opportunity and thereby accelarating economic development and technological progress. The study indicates that some impressive achievements have been made in education during the plan era of 35 years; especially in enrolments, educational institutions and educational expenditure. A close look, however, reveals that the prevailing situation is far from satisfactory. More-than half population is still illiterate. Adult education is far from its targets. The goal of a universal primary education has not been attained. Education of girls has been lagging behind that of boys. This disparity is more glaring in the weaker sections and rural areas. Wastage of resources due to dropout and stagnation still continues especially in females, Scheduled Caste & Tribes and rural areas. Unemployment among educated persons has been increasing constantly. In the absence of adequate information base, weaknesses in estimates of literates, enrolments, cost, requirement and supply of manpower are widely spreaded over and have serious implications. A deliberate concentration on expansion of education based on a high rate of private returns from education has failed to clarify the basic connection between education and economic development. An approach of "specific development always requires specific education and training" has been ignored. The country like India where education system is stressed by the humanities or arts has been bearing an opportunity cost—in terms of a low rate of economic growth and sooner or later the humanists themselves will suffer. A major presumption of the war on poverty and inequality is that education and training are effective ways to bring people out of them. But it is not so in India. The affluent class (holding land/assest and upper middle and higher castes) has been constantly getting higher education and accommodating returns from it. The children of the illiterate and poor parents are clearly at disadvantage. The government's financial assistance and other facilities have not reached to the poor people in desired manner due to one reason or another. Therefore, wide range efforts as made in this study must be considered for developing effective educational planning in the country, especially (a) within the education system, what should be the priorities according to the different tages and sectors of the economy ? (b) what should e the priorities for the types of educational institu- ns on the basis of "demand for specific education r specific purpose" ? (c) what should be the ptimum investment pattern between formal and informal education as compared to investment in other sectors of the economy ? (d) what should be the principles or criteria for the financial assistance by the government to different educational institutions ? (e) How can internal efficiency of the education system be increased, especially minimising the economic wastage by reducing the dropout rate, stagnation period, raising quality of teaching, etc ? (f) How to make a choice between improvements in quality of enrolments and expansion of the educational facilities to meet the requirements of the less privileged society and children coming from the backward areas ? and (g) How can the surplus and shortages in employment market be corrected ?

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To:

Great H.M. Shaikh

—A Real Genius

who has been constantly educating

even a high order of

human society

in multi-splendid fashion

ACKNOWLEDGEMENT

This study deals with some aspects of educational planning using cross sectional and time series approaches. It is an outcome of work done by me with the help of a number of researchers in economic growth, manpower and education. I am grateful to them especially Mr. N.K. Bhushari for his contribution in economic growth, productivity and technological change; Ms. R.R. Bhatnagar for her contribution in adult education; Ms. G. Pandya for her assistance in demand for manpower by occupations and educational levels; and Mr. K.R. Shah for his collaboration in educating poor and backward.

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D.R. VEENA

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1

Introduction : The Framework of the Study

1. Education and Economic Development : A Historical Perspective:

The economic value of education in the process of economic development is broadly assessed by the resources involved in the formation of human capital and the corresponding increments in the productivity of labour force.[1] More concretely the relationship between ratio of educated manpower to physical capital and the increments in per capita net domestic product over a period of time brings out the value of education. This type of educational investment and educated manpower orientation was hardly found in economic thoughts of the Mercantilists and the Physiocrats. However, the word 'art' was there to represent the orientation towards the technical and non-technical efficiency of the labour force.[2]

In the Classical school of economic doctrines, Adam Smith, who not only advocated art as a pre-requisite for division of labour and for increasing the stock of earnings but also strongly emphasized the need of education for the moral and civic peace.[3] Later economists for this school considered education as an effective for population control,[4] social justice[5] and civilized development of society[6]. Thus, at the end of the eighteenth and beginning of the nineteenth century, education was being mentioned as a means for bringing about improvements in purchasing power of labour force, economic welfare and social peace.[7]

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[1] Denison E.F.—"Measuring the Contribution of Education (and the Residual) to Economic Growth" in *Residual Factor and Economic Growth*, O.E.C.D., Paris, 1964.

[2] Sir William Petty—*Economic Writings*, Vol. I, Cambridge, England, 1899.

In the Socialistic school of economic thought, education was considered as one of the correctives to the distortions and imbalances created by the capitalist mode of production.[8]

In the Neo-Classical school of economic doctrines, an analytical shape was given to education and its returns. It was strongly advocated that education should be considered as investment and recommended that it should be incurred up to that level where marginal returns balance the marginal cost.[9] In another form, it was treated as a strong source of human capital formation and an effective source to increase the income streams.[10] Therefore, it was concluded that the most valuable form of investment is investment in human beings.[11]

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[3] Adam Smith—*An Inquiry into the Nature and Causes of the Wealth of Nations*, Vol. 2, Modern Library, New York, 1937.

[4] Malthus, T.R.—*First Essay on Population* 1798, Macmillan Co., London, 1966.

[5] David Ricardo—*On the Principles of Political Economy and Taxation*, Penguin, London, 1971.

[6] Senior, W.N.—(1) *An Outline of the Science of Political Economy*, Farran and Rinehart, New York, 1939, and (2) *Industrial Efficiency and Social Economy*, Henry Holt & Go; New York, 1928.

[7] Mill, J.S.—*Principles of Political Economy*, Longmans Green & Co, New York, 1909.

[8] Karl Marx—*Capital : A Critical Analysis of Capitalist Production*, Vol. I, Foreign Languages Publishing House, Moscow, 1954.

[9] Alfred Marshal—*Principles of Economics*, Part I, Macmillan Co., London, 1961.

[10] Irving Fisher—*The Nature of Copital and Income*, Part I, Macmillan Co., London, 1929.

In the beginning, Keynesian analysis was marked by greater attention of short-run problems of augmenting the effective demand which were matters of immediate concern at that time. During this period Keynes and other economists did not pay attention to factors of long-run consequence such as education. In Neo-Keynesian or Post-Keynesian such as those of Harrod[12], Domar[13] and Joan Robinson[14] the emphasis was shifted to the factors determining the rate of economic growth. The studies subsequently undertaken in this direction, have shown that education is one of the critical inputs in economic development. Consequently a new area of economics has come into existence under title of 'economic of education' enriched by the work of economist such as Schultz[15], Kuznets[16],' Denison[17] and Bowman[18].

In non-economic field, education is regarded pre-condition for stock of society's knowledge[19], for geographical and occupational mobility[20] and for high degree of urbanization[21]

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11. Blandy R.—"Marshall on Human Capital : A Note", *Journal of Political Economy*, Dec. 1967.
12. Harrod R.F.—*Towards a Dynamic Economics : Some Recent Developments of Economic Theory and their Application to Policy*, Macmillan Co., London, 1966.
13. Domar E.—"On the Measurements of Technological Change", *The Economic Journal*, London, Dec. 1961.
14. Joan Robinson—*Essays in the Theory of Economic Growth*, Macmillan Co., London, 1968.
15. Schultz T.W.—"Education and Economic Growth". Sixteenth year book of the National Society for the study of Education and Social Forces in *Planning American Education*, Chicago University Press, Chicago, 1961.
16. Kuznets S.—*Income and Wealth in the United States*, Cambridge, England, 1952.
17. Denison E.F.—*Op. cit.*
18. Bowman M.J.—"The Human Investment Revolution in Economic Thoughts", *Sociology of Eduction*, Spring, 1966, Vol. 39, No. 2.
19. Smelser N.J. and Lipset S.M. –*Social Structure, Mobility and Economic Development*, Routledge and Kegan Paul Ltd., London, 1966.
20. Smelser N.J. and Lipset S.M—*Op. cit.*
21. Charles P. Kindleberger—*Economic Development*, McGraw Hill Book Co., New York, 1958.

which are basic factors of favourable to economic development.[22]

2. Education as a Residual Factor in Economic Development :

Researches during the last two decades or so have shown that changes in the traditional inputs of labour and capital over a period of time do not fully explain the changes in output. A substantial part of output change remains unaccounted for or unexplained. Various attempts have been made to specify the determinants by making of *residual* factor[23] approach either in the conventional Input-Output system or in the frame work of the Cobb-Douglas production function.[24]

The residual factor has been consistently found by economists to be an effective determinant of the economic growth over a period of time although the exact nature and composition of this residual is not commonly agreed upon. A good deal of (economists') work in this context has been to establish a positive association of the residual factor with economic growth. It is also increasingly coming into light that a major component of this residual factor is education[25] which in wider sense includes skill formation and other technical efficiency. Among studies which bring out the importance of education as a major component of residual factor and in other relevent form mention may be made, for the United States of America of

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[22] Charles P. Kindleberge.—*Op. cit.*

[23] The residual is sometimes given a special name such as 'progress' or 'technical progress' or 'technical dynamism' etc. see : Kaldor N.—"Economic Growth and the Problem of Inflation" *Economica*, Aug. & Nov., 1959. Also "Capital Accumulation and Economic Growth" in *Theory of Capital*, Macmillan Co., London, 1961.

[24] In the Cobb—Douglas function, new relationship between factors of production can be written, as $O=A\ L^{a}\ K^{1-a}\ ert$; Where $O=$ Output, $L=$Labour-force, $K=$Capital-stock and $r=$Residual factor for technical progress.

[25] For detailed discussion see : Pandit H.N.—"Ecomomic Approaches to Investment Decision Making in Education," *Indian Educational* Review, N.C E.R.T., New Delhi, Vol. V, No. 1, January, 1970.

Kendrick[26], Bowen[27], Schultz[28], Solow[29], Massell[30], Domar[31] and Denison[32]; for Norway of Odd Aukrust[33] and Nitamo[34] for Canada of Wilkison[35] and Feldstein & Fleming[36]; for England of Wiles[37],

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26. Kendrick J.W. found that 46% of the increase in output during the period of 1889-1957 in U.S.A. can be explained by residual factor ; see : Productivity Trends in the United States, Princeton University Press, Princeton, 1961.
27. Bowen W.G. found that 80% rise in output is conditioned by residual factor ; see : "Assessing the Economic Contribution of Education : An Appraisal of Alternative Approach" in *Economic Aspects of Higher Education*, O.E.C.D. Paris, 1964.
28. Schultz T. W. found that annual growth rate of output in U.S.A. between 1919 and 1957 was about 3% and resources growth per annum was 1%. Such difference is due to human capital as schooling years of workers rose from 4.1 years in 1900 to 10.4 years in 1957 and human capital value of labour force increased from 22% to 42% of the total productive capital ; see : "Investment in human Capital," *American Economic Review*, Vol. 51, 1961.
29. Solow R.M.—"Technical Change and Aggregate production Function", *Review of Economics and Statisics*, Aug., 1957.
30. Massell B.F.—"Capital Formation and Technological change in United States Manufcturing," *Review of Economics and Statistics*, May, 1960.
31. Damar E.—*Op. cit.*
32. Denison E.F.—*Op. cit.*
33. Odd Aukrust found that the income elasticity with respect to capital was 0.203 and with employment, in terms of hours, was 0.763 ; see : "Investment and Economic Growth", *Productivity measurement Review*, February, 1959, No. 16.
34. Nitamo O.—"Development of Productivity in Finish Industry (1925-52)", *Productivity Measurement Review*, Nov., 1958, No. 15.
35. Wilkinson B W.—"Present Value of Life-time Earnings for Different Occupations", *Journal of Political Economy*, Dec., 1966, No. 74.
36. Feldstein M.S. and Flemings J.S.—"The Problems of time-series Evaluation Present Value *versus* Internal Rate of Return Value, "*Review of Economics and Statistics*, May 1964.
37. Wiles P.J.D.—"The Nations' Intellectual Investment", *Bulletin of Oxford University Institute of Statisitcs*, 1956.

Handerson[38], Blaug[39], and Peston & Ziderman[40]; for Mexico of Martin Carnoy[41]: for Northern Nigeria of Samual Bowles[42]: for North West Europe (U.K., Belgiam, Norway, Denmark, France, Netherland and West Germany) and Italy of Denison[43] and for India of Panchmukhi[44], Harberger[45], Hussain[46],

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[38] Henderson, D.S.—"Estimates of the rate of Return to Education in Great Britain, "*The Manchester School*, Manchester, Sept., 1965.

[39] Blaug M.—"The Rate of Return on Investment in Education in Great Britain, "*The Manchester School*, Sept., 1966, and "The Private and Social Rates of Returns on Investment in Eduaction: Some Results for Great Britain, "*Journal of Human Resources*; Summer, 1967, Vol. 2, No. 2.

[40] Peston, M. and Ziderman, A.—*The Utilization of Education Manpower : A Preliminary Report*, Oliver and Boyd, London, 1967.

[41] Martin Carnoy—"The Rates of Returns to Schooling in Latin America, "*Journal of Human Resources*, Summer, 1967, Vol. 2, No. 1.

[42] Bowels, S.—*The Efficient Allocation of Resources in Education : A Planning Model with Application to Northern Nigeria*, Ph.D. Dessertation, Harvard Unversity, 1965.

[43] Denison, E.F. found that contribution of education through improvements in the quality of labour force registered increases from 12.4% during 1909-29 to 23% in 1929-57. Corresponding contribution of education to the productivity of worker increased from 29% to 42% in U.S.A. Similarly, he also found that contributions of education and advance knowledge in gross domestic product and per worker gross domestic product, *i.e.* per worker productivity, registered increased by 38% and 56% respectively during the period of 1950-52 in U.S-A. Such values for same period in the North-West Europe are 21% and 26%; in U.K. are 44% and 61%; in Belgium are 39% and 29%; in Norway are 29% and 30%; in Denmark are 27% and 37%; in France are 22% and 23%; in Netherlands are 22% and 29%; West Germany are 12% and 17% and; in Italy are 20% and 21%; see: "Measuring the Contribution of Education and the Residual to Economic Growth" in *Readings in Economics of Education*, U.N.E.S.C.O., 1968.

[44] Panchmukhi P.R.—"Note on Educational Capital in India", *Indian Economic Journal*, Jan.—March, 1965, Vol. 12, No. 3.

[45] Harberger, A.C.—"Investment in Men *versus* Investment in Machine : The Case of India", *Education and Economic Development*, 1966.

[46] Hussain, I.Z.—"Returns to Education in India : An Estimate" in *Education as Investment* (ed.) by Baljit Singh, Meenakshi Prakashan, Delhi, 1967.

Kothari[47], Sharimali[48], Nalla Gounden[49], Mukerji & Krishna Rao[50], Choudhari[51] and Tobias & Queener[52]. For a comparative analysis of numerous developed and less developed countries studied by Denison[53], Harbison & Myres[54], Correa[55], Parnes[56], Tinbergen & Bos[57] and U.N.E.S.C.O[58] may be mentioned. Most of the empirical studies commonly indicates that education is one of the basic inputs in economic development. It is shown in these studies that the stock of educated human capital in less developed countries is very low in comparison to developed countries and, therefore, an optimum utilization of physical capital and maximum exploitation of natural resources could not be made.[59] Hence, there is considerable need to undertake studies on manpower and

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47. Kothari, V.N.—"Returns to Education in India" in *Education as Investment* (ed.) by Baljit Singh—*Op. cit.*
48. Shrimali, P.D.—*The Study of Pattern of Employment and Earning Among Graduates in Lucknow*, University of Lucknow, 1966-67.
49. Nalla Gounden, A.M.—"Investment in Education in India" *Journal of Human Resources*, March, 1967.
50. Mukerji, K. and Krishna Rao N.—"Education and Economic Development in India (1951-61)" in *Education as Investment*, (ed,) by Baljit Singh—*Op. cit.*
51. Choudhary, D.P.—*Education and Agricultural Productivity in India* Ph.D. Thesis, University of Delhi, April, 1968.
52. Tobias G. and Queener R.S.—*India's Manpower Strategy Revisited 1959-67*, I.T.A.M.R., New Delhi, 1968.
53. Dension E F.—*Op. cit.*
54. Harbison, F. and Charles, A. Myers—*Education, Manpower and Economic Growth*, McGraw Hill Book Co., New York, 1964.
55. Correa H.—*Economics of Human Resources*, North Holland Publishing Co., Amsterdam, 1962.
56. Parnes, A.S.—*Forecasting Educational Needs for Social and Economic Development*, O.E.C.D., Paris, 1962.
57. Tinberger, J. and Bos, H.R.—"A Planning Model for Educational Requirements of Economic Development in *Residual Factor and Economic Growth*, O.E.C.D., Paris, 1964.
58. U N.E.S.C.O.—*Op. cit.*
59. Adam Curle—"Some Aspects of Educational Planning in Underdeveloped Areas", *Harvard Educational Review*, Vol. 32, No 3; Harbison F. and Charles A. Myers—*Op. cit*; and; Planning Commission of India—Third Five Year Plan, 1964.

educational planning[60].

3. Some Conceptual Issues and Problems

As mentioned earlier, increasingly it has been found that an important element of the residual factor is education. It is also demonstrated that availability of trained manpower in sufficient quantities is a pre-condition of economic development.

Here, an important distinction between the economic concept of *labour* as an input of production and the functional concept of *manpower* should be clearly understood. The demand for labour represents the number of persons available at given wage rates and volume of wages. The labour input can be considered to be a definite volume of work units like man hours/days per annum required for a given target of production in homogeneous units so that no distinction of quality etc. is made. It is also substitutable with other factors of production to a certain extent.

The concept of labour assuming homogenity, is not in conformity with actual situations. Similarly, it can no longer be assumed that supply of labour is always sufficient in quantity and quality to match the demand. There may be a lack of correspondence between requirements and avaliability of labour by different categories and skills, which is always prone to correction through wage differential mechanism. The heterogeneous aspect of the labour input, which emphasises the importance of varying skills, training and technological progress, represents the functional concept of manpower.

The concept of manpower, because of implicit fact of differentiation between its various constituents, is significantly associated with the requirements of economic development.

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[60] (1) Adam Curle—*Op. cit.* and (2) Harbison, F. and Charles, A. Myers—*Op. cit.*

With change in the stage of economic development 'manpower' will also change. Thus, the concept is contrary to the homogeneous labour input concept. It may be largely due to interaction of elements like education, training and acquisition of skills, technical innovation and increasing productivity.

It is a well established fact that manpower at different skills is significantly related to development. But an important question is whether this relationship is unique or systematic and can be expressed in quantitative terms for an economy. There is a need of separate study for each economy or region[61].

Due to differences among regions regarding demographic, geographical, socio-cultural and developmental factors, relationship between education and economic development, rates of return from education, manpower requirements by skills and the relationships of manpower by skills or educational levels in specific economic activities are specific to specific regions. As an illustration, one may look to the results given by Schram and Ruggles who found that the coefficient of correlation of literacy with urbanisation is 0.04 for the Latin American countries and 0.64 for Asian countries.[62] Further they pointed out that such differences can by explained by differences in levels or stages of developmental process[63]. Such explanation also can be seen in a few other studies[64]. Apart from this explanation, for advocating single region approach, on one has tried to distinguish between the extent of response of manpower at different educational levels in different economic activities[65]. Therefore, there is considerable need to derive relationships between different types/levels of education and different economic activities or indicators to explore the possibilities for maximum utilization of educational resources.

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[61] Bedia, K.—"Pattern of Education and Economic Growth" *The Economic Record*, Australia, Sept., 1971, Vol. 46, No. 115.

[62] Quoted from the paper written by William, A.H.—'Literacy and Community Economic Development in Rural Areas," *Rural Sociology*, Pennsylvania, Fall, 1973, Vol. 38, No. 3.

[63] William A.H.—*Op. cit.*

[64] Bedia K.—*Op. cit.*

Another relevant problem is to examine whether demands for manpower can be derived from the production functions in the same manner as demand for labour input is derived. The argument has been often expressed that manpower demands exist as derived demands, reflecting in ultimate analysis the final demands for goods and services of various kinds, produced by different industries or activities of the economy[66]. This debatable view has two aspects: firstly, whether manpower demands can be completely determined from the final demand for goods and services and; secondly, whether all manpower demands are really secondary or derived in nature.

In the context of the first aspect, it can be stated that if manpower represents a schedule of interaction between labour and skill-acquisition process then it cannot be exactly derived from a production function. Further, it is really difficult to accurately quantify and identify the componets of the residual factor in production function analysis. It is the identification of the components of the residual factor which is really needed for manpower and educational planning. Moreover, the rate of technical progress can neither be predicted before hand nor can be planned exactly since extensive changes in technological levels and productivity influence the quantitative and qualitative aspects of manpower requirements. Thus, the levels of production cannot be adequately determined.

A second set of considerations which needs to be taken into account is that the rate of technological advance which determines the demand for manpower of various types cannot

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65. In context of Gujarat see: Veena, D.R.—"Pattern of Education and Econcmic Development : A Case Study of Gujarat", *Anvesak*, S.P.E.S.R., Vol. 3, No. 1-2, June-Dec., 1973.
66. Sten, Olof Doos—Employment Forecasting. Report of the International Seminar on Employment Forecasting Techniques, O.E.C.D., Paris, 1962.

be claimed to be fully dependent on demands for goods and services. For example, the high level scientists and technologists are a pre-requisite for ensuring steady increase in the rate of technical progress through scientific discoveries and technological innovations and can, in no way, be said to be directly dependent upon production or levels of gross domestic product.[67] Therefore, all categories of trained manpower should not be treated secondary in nature. Hence, it is more appropriate to consider the various factors of production as complementary to one another and they should not be considered totally dependent on level of output. As a result for future projections of manpower demands, output levels cannot be the sole determinants.

Although the role of manpower in economic development has been decisively recognised yet hardly any recognizable importance has been given to the analysis of the effect of economic needs on the size and structure of education and training programmes in various theories of economic growth. Since last few years, the importance of supply by skills to match the manpower requirements corresponding to the target rate of growth is being recognized. It is possible to project optimum levels of manpower for attaining specified economic target by establishing quantitative relationship between economic development and manpower requirements[68]. However, in actual empirical work, the establishment of these relationships is handicapped in many ways, for example, due to lack of direct correspondence between each occupation and level of education/training, etc. Recently attention of planners and policy makers has turned to the

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67. See: National Bureau of Economy Research—*The Rate and Direction of Inventive Activity*, N.B.E.R., New York, 1962.
68. See: (1) Sten, Olof Doos—*Op. cit.*; (2) Guttried Bombach—"Long Term Requirements for Qualified Manpower in Relation to Economic Growth" in *Human Capital Formation and Manpower Development* (ed.) by Wykstra, R.A., Macmillan Co., London, 1971; and (3) Harbison, F.—"A System Analysis Approach to Human Resource Development Planning" in *Manpower Aspect of Educational Planning*, U.N.E.S.C.O., Paris, 1968.

importance of educational planning for advance programming of manpower outflows from educational sector to labour maket[69].

From the purely economic view point, the problem of ensuring a desired rate and composition of manpower supply is a part of the problem of ensuring an optimization of production factors. So optimization of manpower supply is part and parcel of overall economic optimization. However, actual operation of manpower policy or educational planning can hardly be based solely on economic criteria. From time to time, political, social and other non-economic considerations intercept the logic of purely economic logic and play an important role in determining the actual structure and magnitude of educational and manpower requirements[70].

4. Objectives

Planning for the economic development of an economy has manpower planning as one of its vital components. Manpower requirements in a development plan are specific to the pattern of economic development chosen and change with the structural change in the economy envisaged in the plan. Education, on its own, is of critical importance to economic development. Moreover, it is also important for determining the nature and pattern of manpower available in a country.

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[69] See: (1) Tinberger, J. and Bos, H.R.—"The Global Demand for Higher and Secondary Education in the Under-developed Countries in the Next Decade". Policy Conference on Economic Growth and Investment in Education. Also in *Challenge of Aid to Newly Developing Countries*, O.E.C.D., 1961; (2) Correa, H. and Tinbergen, J.—"Quantitative Adoption of Education to Accelerated Growth", *KyKlos*, Vol. 15, 1962. Also available in *Planning Education for Economic and Social Development*, O.E.C.D., 1962; and (3) Planning Commission of India—*Draft Third Five Year Plan*—*Op. cit.*

[70] See: (1) William, A.M.—*Op. cit.*; and (2) Smelser, N.J. and Lipset, S.M.—*Op. cit.*

In this context it may be worthwhile to study the role of education in economic development as well as to analyse the educational and manpower implications of a development plan for a particular developing economy such as India. In the case of a country like India, however, difficulty arises because of its large size and wide diversification. There are wide differences in socio-cultural, economic and geographic conditions among regions resulting in variations in the rate of economic development and pattern of industrial diversification. Due to such variations, for a meaningful analysis, it is but natural to select a single region such as Gujarat for undertaking this study.

5. Data and Mode of Analysis:

Analysis of the available literature on èducation and economic development provides the background of the study and is also an important source of hypotheses on the relationships studied. The hypotheses have been tested with the help of data which are mainly cross-sectional. The study uses secondary and primary data for its statistical analysis.

The various relationships between various indicators of economic development and educational levels, have been studied with the help of linear correlation and regression techniques. Projections of manpower demand are made with the help of extrapolation method of past trend as well as Leontief's Input-Output Model. Detailed information regarding data, hypotheses and methods of analysis has been given in each Chapter.

6. Scheme of the Study

The following Chapter 1 on objectives and framework of study, Chapter 2 deals with pattern of education in India. Chapter 3 deals with position of literates in Gujarat. Overall position of adult education in Gujarat is presented in Chapter 4. Some analytical views on educating poor in backward regions have been presented in Chapter 5. Discussion on productivity and technological changes in manufacturing activities is presented in Chapter 6. Chapter 7 deals with methodologies involved in analysis and projections of the manpower requirements for different occupations in some major economic activities or sectors of development. Policy implications from the analysis undertaken in the study presented and guidelines for manpower and educational planning are presented in the Chapter 8.

2

Dimensions of Indian Education System

Education being an important industry—is not only the producer and seller but also one of the chief purchasers of services of semi and highly skilled manpower. Education is also an important factor in creating social order founded on the values of socio-economic justice, freedom and equal opportunity and thereby accelerating economic development and technological progress. Due to such recognition to education, an underlined attempt has been made on different aspects of education by various committees and commissions in India. Particularly, during last three decades, works of the Sargent Committee on post-war educational development in India (1944), the Radhakrishnan Commission on university education (1948-49), the Kher Committee on the administrative aspects of primary education (1951), the Secondary Education Commission on the secondary education (1953) and Kothari Education Commission for detailed look on the whole education system (1964-66), are well-known.

1. Deal of Achievements

A great deals of achievements has been made in education during the period of five year plans. The enrolments in schools went up by more than three times and that in the universities and institutions of higher education by more than seven times. The enrolments at primary, secondary and higher education increased at the annual rates of 6.5 per cent, 8.5 per cent and 10.1 per cent respectively. The corresponding educational institutions expanded at the annual rates of 3.7 per cent, 10.9 per cent and 6.3 per cent. For this expansion total expenditure increased at the rate of 12.8 per cent, while direct educational expenditure rose at the rate of 12.5 per cent and indirect expenditure at the rate of 11.3 per cent. The per capita educational expenditure increased at the rate of 5.1 per cent. The share of educational expenditure to national income went up from 1.1 per cent to 3.2 per cent during last 35 years. These are impressively high rates of growth.

2. Prevailling Drawbacks

A close look, however, reveals that in spite of the recognised role of education in economic development and substantial growth in education, the existing situation is far from satisfactory (A.R. Kamat: *Economic and Political Weekly*, 24 Jan. '72). Though the literacy rate has gone up from 17 per cent in 1950-51 to 41 per cent in 1981, yet more than half population is still illiterate. Adult education is far from its targets. The goal of universal primary education has not been attained. In this respect, except Kerala, each State has failed. Madhya Pradesh, Bihar and Rajasthan have 40 per cent school going children. Education of girls has been lagging behind that of boys at each educational level. This disparity is more glaring in the case of weaker section of the society, particularly scheduled castes and scheduled tribes, and rural areas, especially in the case of smaller villages. Wastage of resources due to drop-out and stagnation still continue at a very high rate, particularly among the females, rural areas and scheduled castes and tribes. In fact all past experiences show that at the point of plannning policy, the greatest stress is laid on universal mass education, education of women, rural areas, scheduled castes and tribes. At the point of fixing quantitative targets, proportionate expansion of all sectors is provided for. But the highest achievements are observed in the field of urban education, secondary and higher education, man's education, upper caste education and so on. The policy-wise priority sectors including adult literacy fall much behind the target (S.C. Sukla:

Mainstream, 6 Feb. '71). The "open door policy of enrolment", particularly, at higher education helped in generation of mass unemployment among educated persons. All these issues force to analyse the existing education system in detail and explore the possibilities of a new dismension in the existing system.

3. Inconsistent Information

In the absence of adequate and consistent information, it is quite difficult to sketch the real picture of educational development (A.K. Sen: *Crisis in Indian Education*, 1971). For example, in the primary education, according to the Planning Commission 62 per cent students have been enrolled at the age group of 6-11 in 1960-61 (*Draft of Fourth Plan*, p. 280). While the Ministry of Education shows this to be 55 per cent (*Education Commission Report*, p. 161). There may be differences due to coverage of the standards. The Planning Commission covers enrolments from standard I to V while the Ministry of Education covers from Standard I to IV. In such cases the estimated rate of the Planning Commission should be lower than the Ministry of Education because of the lower proportion of enrolment at higher standards. Not only that the Population Census—1961 has noted the value of this rate at 44 per cent. Let us take another example of some inconsistency in data and information. According to the Ministry of Education, school enrolment in the age group of 6-14 is 41.7 million in 1960-61 (*Education in India 1960-61*, Vol. II). While the Census—1961 shows 34.6 million of the population to lie in the group of non-working force. (Census—1961, Vol. I, Part II-B (i) Pl. 86). So difference is of the order of (41.7—34.6 =7.1 million. In the Census—1961 14.5 million workers are between or at the age of 0-14. Assuming the literacy rate of 30 per cent of urban workers (Census-1961, Vol. I, Part II-B (i) p.86) to be valid, even an over-estimation, in the case of total workers in both the rural and urban areas and between the age group of 0—14, estimated volume of school going children comes to 4.8 million. Even then difference comes to (7.1—4.8=) 2.3 million of over estimation in the account of the Ministry of Education. Some story repeats with 1971 and 1981 data.

Further weakness also can be noted about estimates of cost, demand for and supply of manpower etc. which gives serious implications and creates problems for a reliable study. Although the Census information is definitely a reliable source but the problem with the data is the time lag of a decade.

There are also wide differences between the period for completing a particular educational level, like secondary education across States. There are also considerable differences in per student government expenditure, financial assistance and institutional role at a particular educational level across the States. Such discriminations and inequalities are quite unfair for healthy development of education in the country

4. Relationship Between Education and Economic Development:

It is granted that the education is an important factor for private returns and result of that is a constant upliftment of the economic situation and social justice. This general acceptance has ignored the "specific requirement of education for specific development." Actually in private returns only a small proportion of the community is able to proceed with higher education for one reason or another. Thus, if education is expanded, average private returns tend to be lower than expected. Such deliberate concentration on expansion of education based on a high rate of private earnings has also failed to clarify the basic connection between education and economic development. Some economists assessed the contribution of education to economic growth of some developed countries with the help of the production functions. Can we call it a derived demand estimated for skills and specific knowledge of labour in our less developed country? Obviously not, since technological and structural changes are not taken into account.

In other way, a correlation shows that rich countries spend a great amount on education or have large number of enrolments, while poor countries on the whole purchase little education. Let us say no more than that rich countries are rich and poor are poor. Therefore, Harbinson and Myers' work

(*Manpower Education and Economic Growth*, 1964) of relationship between "Index of human resources and per capita gross domestic product" is not beyond this criticism. However, the favourable impact of more education on national income is usually taken for granted. But it throws up severval questions. For example, increased input of education increases gross national product or growth rate of output in a once-for-all fashion! Of course, unless education is steadily enlarged quantitatively and qualitatively, there will not be continuously increasing growth.

Generally, education imparts intellectual flexibility in people's work. But the specific purpose of development always demands specific education. Some results of correlation between marginal (differences in) educational effort and the marginal economic growth rate are worked out. Particularly, (*i*) Education in medical science, technology, agriculture and applied engineering science is significantly related to gross national product (0.69): (*ii*) education in commerce, business, economics, political science, public administration, social welfare, sociology and statistics is also significantly related to gross national product (0.62); (*iii*) Education in arts, music, fine arts, literature, languages and history is not significantly related to the gross national product (0.16); and (*iv*) Education in pure secience *i.e.* in astronomy, biology, chemistry, physics, zoology, mathematics, etc. is also not significantly related to the gross national product (0.08). It may be due to, that first two groups of education are directly related to various decision-makings while latter two are not. A humanist in by gone days could ignore or neglect material progress but not in this twentieth century. Thus, the country like India whose educational system is stressed much on the humanities must bear an opportunity cost—in terms of a low rate of economic growth and sooner or later the humanists themselves will suffer. To avoid the misunderstanding, it is necessary to emphasise that this study is only attached to the factors promoting economic growth. From that angle, it matters where the stress in educational system should be placed. So top priority should be given to the material progress, relatively more effective investment and other growth promoting policies, rather than to push them into the background.

Further by sectors of the economy, the relationships between educational levels and indicators of economic development are also specific. For example, the correlations between, (*i*) agricultural development and primary education (0.92); (*ii*) industrial development and some specific professional and technical education (0.87); and (*iii*) social changes in favour of economic development as reflected in the adoption of family planning and higher education (0.64) are some important values indicated in the parenthesis (D.R. Veena: *Journal of Gujarat Research Society*, April 1976). Thus, it is quite clear how the economy's resources should be allocated among various uses of education, *i.e.* on the basis of specific education for specific development. Therefore, advocacy of rising ratio of educational expenditure to national income is less important as compared to the ratio of resources made available for required types of education to national income.

It is well-known that quality of education at each level is constantly declining and present education system cannot fulfil the requirements of the development. A genuine reason may be lower level of average teacher's salary. The real average salary rate of teacher (and its growth also) with particular educational level is lower than that of a person with same educational level in different occupations. Therefore, more qualified persons would like to go to other sectors of the economy rather than to the educational sector. Thus educational industry has no magnitude power to attract the most qualified persons for teaching. Then, how poor quality of teachers can formulate and adopt the effective education system either by reforms in examination, teaching and internal assessment? On the contrary, the ratio of students to a teacher at particular education has also gone up constantly, which is an increasing quantitative pressure and decreasing quality of education.

5. Imbalances Between Demand for and Supply of Manpower

In the absence of adequate pattern of education, imbalances between demand for and supply of educated and skilled manpower are obvious facts. Apart from that estimates of demand for and supply of manpower based on various assumptions related to the base year estimates of surplus, growth of output, changes in the structure of output, capital technology and certain norms are also not given due place correctly. On the contrary, issue of manpower supply has been left without its effective estimates. Thus the classical system of "supply creates its own demand" or competitive system of supply market and monopolistic situation of demand market created a large scale unemployment among educated persons.

In this situation it will not be useless to explore the key steps in macro-projections of the demand for and supply of educated and skilled manpower for further effective edcational planning in the country. For demand projection, we require: (*a*) estimates of the base year data on employment and unemployment of educated and skilled manpower with reliable coverages; (*b*) adjustments to correct for sub-optimality in base year employment particularly in reference to effective assessment of (*i*) number of vacancies, (*ii*) structural imbalances, and (*iii*) quantitative weakness of educational and training programmes and job experience; (*c*) projection of the growth in demand for evaluating (*i*) growth and structural change in the economy, (*ii*) measurements of elasticity of demand with respect to changes in output, wages and structural change, and (*iii*) changes in wage levels of educated and skilled manpower.

For supply projection, we require : estimates of (*i*) the base year data on employment and unemployment of educated and skilled manpower, (*ii*) gross additions from education, training, upgrading on the jobs etc., (*iii*) wastage from migration, retirement, death etc., (*iv*) labour force participation rates at different age groups, (*v*) adjustment for assumed changes in hours and intensity of work, (*vi*) supply of requirements to be met by citizen manpower. For balancing demand and supply, cost estimates and some sensitivity, (*i*) adjustments of supply and demand to achieve balance of stock and flow balance in target year, (*ii*) minimization of costs of implied equcation and training programmes, and (*iii*) application of sensitivity analysis

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showing sensitivity of policy conclusions to variations in the key assumptions are required to study. (D.R. Veena, *Anvesak*, December 1974 and *Arthavikas*, Jan 1976).

The Indian plans could not adjust with the above methodology. Even empirically, adopted overall growth rate of output for manpower projection, at 6.6 per cent could not be achieved between 1961—76 and, therefore, it is also doubtful about 7 per cent growth during the period of 1961—86 (*Education Commission*). Similarly we could not become strict about our end-use or norm method *i.e.* on 2,000 population requirement of a doctor or so; which ultimately depends on purchasing power of the persons. On the contrary, open door policy of enrolments, particularly at higher education, created the problem of unemployment among educated people. Thus, policy of expansion of higher education based on non-economic considerations should be reviewed thoroughly.

Next question is that further expansion of education should go up or not? Actually it should be based on (*i*) returns of education to the economy, and (*ii*) requirements of skilled and educated manpower to the economy. In case of returns, Mark Blaug's study shows that annual contribution of the primary education over literacy is 15 per cent; of the middle school education over primary education is 14 per cent; of the secondary education over middle is 10.5 per cent; and of the higher education over secondary education is 9 per cent. If the Bank market interest rate, *i.e.* existing at present, is between 10 to 11 per cent per annum, then the levels of the higher education are not profitable. On the contrary, for effective investment returns should be around 12.5 per cent. As for the cost of education, average annual cost of one under-graduate of science or arts is equal to 22 students in primary education; one post graduate in arts equal to 41 students in primary education; and one post-graduate in science is equal to 89 students in primary education (M. Blaug *et al.*, *The Census of Educated Unempolyment in India*, Table 8.10). Thus, allocation of resources in education should not be blindly adopted. The requirements of skilled and educated persons also should not be based on derived demand which is worked out with the help of residual approach. This should be estimated with the help of detailed analysis of variables as listed above.

6. Wastage of Resources:

Moreover, due to continuous over-supply of educated manpower, economic value of education is constantly declining. An attempt of Panchmukhi (*Journal of Higher Education*, Vol. I, No. 1) shows that wage rate at constant prices by occupation has increased while by educational level has declined over period of time: because educational level, in terms of years, has risen much faster than the rise in wage rate in a particular occupation.

The wastage of resources is not only due to under valuation of education and expansion of wrong types of education but also due to a high rate of drop-out and stagnation. This wastage rate at lower level of education is found between 56 to 80 per cent which is much higher than that of some other less-developed countries. Particularly, a study on the wastage and stagnation of primary and middle schools in India shows that this ratio is 65.3 per cent upon V standard and 78.4 per cent up to VIII standard. Such wastage is definitely much higher in rural areas, female and weaker section of the society particularly Scheduled Castes and Tribes as compared to the urban areas, male, and non-weaker section of society. By this way wastage of resources, is estimated to 27.6 per cent of total expenditure on the education.

Although a significant fall from 60 to 40 per cent has been noted in the drop-out rate, yet the targets of drop out for the age group of 13 onward shows that the rate is still very high. The rate of non-starters in primary education is 10 per cent; drop-out in primary education is 36 per cent; stop with primary education is 21 per cent; and enrolment for secondary education is 33 per cent.

A major presumption of the war on poverty is that education and training are particularly effective ways to bring people out of poverty. The Government also presume that education is the most important single factor for providing maximum equal opportunities and for minimization of income inequalities. Let us see how well-founded this presumption is in the context of India. As we have observed that education is of benefit to society in general and not at a specific or individual level. It is noticed that additional expenditure on education has not helped much to raise the income level of poor class, economically as well as culturally.

It is clearly noted that size of land particularly in rural areas and wealth particularly in urban areas are closely related to higher levels of education and constantly getting advantages from education. The children of the illiterate poor parents are clearly at disadvantage. The reason may be related to distance between the residences and the schools in rural areas, household work and compulsion to supplement family income, which inhibit the parents in sending their children to schools. (M.L. Dantwala: *Vishleshan*, June 1976). The poverty also appears as a dominant factor in explaining educational wastage by high rate of drop-out and stagnation. This picture is more closely attached to rural areas and weaker sections of the society. The existing government policy of financial assistance and other types of priorities could not help much to come out of it. Generally, (*i*) the children of better-off-society are getting higher education and better quality of education while poor class of the society does not; (*ii*) the nutritional condition of better-off-society is better than that of the children coming from poor class; and thereby (*iii*) the better-off-society's people with greater ability and capacity can get quick and better opportunities of employment and status as compared to poor class. Therefore, transfer of the income from richer class to the poorer ones cannot take place unless some wide and special efforts, through expansions of direct productive activities and social overhead capital to raise the level of their economic and cultural dimensions, are made so that the levels of inequality in income and poverty can be minimised.

7. A Need for New Look

It is quite clear that educational mode's of developed countries cannot be blindly adopted for the underdeveloped country like India, because economic and non-economic conditions and traditions of developed countries are quite different from the underdeveloped countries. The education in developed countries is considered as a consumption item with a view to have an easier way of life but in underdeveloped country like India it becomes an investment for achieving self-sustained economic growth. In view of that, this study rises the following issues, which should be taken up seriously for developing effective educational planning; (*i*) Within the education system, what should be the priorities according to the different stages and sectors of the economy? (*ii*) What should be the priorities for the types of educational institutions on the basis of demand for the specific education for specific purposes? (*iii*) What should be the optimum investment pattern between formal and informal education and what should be the size of investment in education as compared to investment in other sectors of the economy? (*iv*) What should be the principles or criteria for the grants given by the Government to different educational institutions ? (*v*) How can the internal efficiency of the education system be increased, minimizing the economic wastage by reducing the drop-out rate, stagnation period, raising quality of teaching, etc.? (*vi*) How to make a choice between educational improvements in quality of enrolments and expansion in the educational facilities to meet the demands of the less privileged society and children coming from backward areas? (*vii*) How can the surplus and shortages in labour market be corrected?

3

Position of Literacy

1. Literates in the State

A package of minium needs of human beings consists of food, clothing and shelter. Muslim education is just at the periphery. Education imparts literacy, functionality and social awareness which ultimately generates better understanding, skill formation and civilised manner in society. Thus, education is regarded as 'end' as well as 'means'.

We have accepted primary education as a minimum need. With due consideration of primary education specific emphasis has been made on female education, education for weaker sections like Scheduled Castes and Scheduled Tribes and for rural areas. But have we achieved success in literacy at a desired level in the highly advanced State of Gujarat?

Since formation of Gujarat as a separate State in May 1960, its population has increased from 206 lakhs in 1961 to 340 in 1981. Area-wise, the population has increased from 153 lakhs in 1961 to 234 lakhs in 1981 in rural areas whereas it has increased from 53 lakhs in 1961 to 106 lakhs in 1981 in urban areas. The share of rural and urban population has changed from 74.2 per cent and 25.8 per cent in 1961 to 68.9 per cent and 31.1 per cent in 1981.

Corresponding to the increase in population, the member literate persons has increased from 63 lakhs in 1961 to 149 lakhs in 1981. Area-wise the number of literate persons has increased from 37 lakhs in 1961 to 85 lakhs in 1981 in rural areas; and from 26 lakhs in 1961 to 64 lakh in 1981 in urban areas.

2. Average Growth

The overall literacy rate has increased from 30.3 per cent in 1961 to 43.8 per cent in 1981. By areas, it has increased from 24.1 per cent in 1961 to 36.3 per cent in 1981, in rural areas; whereas it has increased from 48.8 per cent in 1961 to 60.3 per cent in 1981 in urban areas.

It indicates that the average annual change or growth in literacy was 0.67 per cent during 1961-1981. The situation as referreds literacy of female, Scheduled Castes and Scheduled Tirbes and rural population is far from satisfactory.

The increasing population pressure has not been keeping pace with the literacy rate. The rise in literacy rate by 0.67 per cent per annum with break-up of 0.61 per cent in rural areas and 0.58 per cent in urban areas, is a marginal improvement as against the 2.4 per cent annual growth rate of population. As a result the number of illiterate persons increased from 143.8 lakh; in 1961 to 191.0 lakhs in 1981. By areas, it increased from 116.2 lakhs in 1961 to 149.1 lakhs in 1981 in rural areas; and from 27.2 lakhs in 1961 to 42.0 lakhs in 1981 in urban areas. This situation is more severe in case of female population, Scheduled Castes and Scheduled Tribes and in rural and backward regions of the State.

Thus an important question is that by this annual growth rates of literacy (0.67 per cent) and population (2.4 per cent), will Gujarat be able to achieve cent per cent literacy rate even by the next half century? Certainly it is a difficult question to the present enrolment policy, particularly at primary education.

The estimates of effective enrolment rate of primary education (I to V Stds.), *i.e.* the ratio of students in the age group

6-11 years to the total population in the corresponding age group, came to 46.6 per cent in 1960-61 which varies from 34.7 per cent girls to 57.9 per cent boys. Whereas for 1969-70, it comes to 63.9 per cent with break-up of 48.3 per cent girls and 77.7 per cent boys.

By this way estimated values of effective enrolment for primary schools in 1978-79 comes to 81.2 per cent which varies from 61.9 per cent girls to 97.5 per cent boys. It indicates that on an average we have been able to enrol 1.7 per cent students with break-up of 1.3 per cent girls and 1.9 per cent boys: which is very far from the 2.4 per cent annual growth rate of population.

It implies that we are still far from the target of 'universalisation' of primary education in the State. This situation is worse in the case of backward regions, particularly Banaskantha, Kutch, Panchmahals, Dangs, etc. dominated by scheduled tribes and scheduled castes.

Whatever number of enrolled students in primary schools we have, if we make them literate (by definition literacy means a person who can read, write and understand in his own language) then at least they must attend schools regularly for two years. The wastage rate of student between 1st Std. to 2nd Std. comes to 46 per cent with breakup of 48 per cent girls and 45 per cent boys. Accounting this wastage rate for estimating 'net' enrolment rates which can make students literate in the age group of 6-11 years, comes to 25.2 per cent in 1960-61 with break-up of 18.1 per cent girls and 31.9 per cent boys. It has increased to 43.9 per cent in 1978-79 with break-up of 53.6 per cent boys and 32.2 per cent girls.

It shows that we have been able to enrol one person (to make him literate) per annum in age group 6-11 years during 1961—79 with break-up of 0.8 per cent girls and 1.2 per cent boys. At this rate, we will not able to reach cent per cent effective enrolment rate by next 2040 A.D. with the fact of increasing population growth rate of 2.4 per cent per annum.

3. Economic and Environmental Forces

This situation will be more alarming in backward regions, scheduled tribes and scheduled castes, which constitutes one-fifth to the total population and mostly living below poverty line.

Why have we not been able to achieve the goal of universalisation of primary education since formulation of the State? Why have we not been able to maintain cent per cent 'effective' enrolment rate? What are the factors responsible for them? While considering these questions, the most striking reason has been argued among Indian educationists is relating to the lack of adequate availability of 'pyhsical' educational facilities.

But it seems that it is now no longer valid. As 91 per cent villages have primary schools, the primary school facility available to the population within walking distance of 1.5 km. is also substantial as the sphere of this facility covers 98 per cent of the population. Moreover, it does not significantly vary from one region to other.

Out of total primary school teachers, 85 per cent are trained, except in a few districts like Kutch and Dangs. In spite of these, the low level of enrolment, poor average attendance (73 per cent) and wastage rate (58 per cent) still continue, particularly in socially and economically backward regions.

Thus, conventional reasons like lack of adequate educational facilities, distance, between residence and schools are no longer valid. Our observations based on quantitative and qualitative information about various scheduled castes and tribes and non-scheduled castes and non-tribes communities in rural and urban areas reveal that reasons behind a continuous low rate of enrolment, low rate of average attendance and high rate of wastage are mainly two: (*i*) economic forces; and (*ii*) environment factors.

Economic factors where a high level of poverty pressurises and creates the situation of compulsion of household duties and work to supplement family income particularly in rural areas which deprives children to get school education.

The environmental factors, particularly social and cultural, which are very weak due to a high level of illiteracy of the adult parents particularly in socially depressed communities of scheduled castes and scheduled tribes. Their illiteracy level is not allowing them to be motivated for depriving the benefits from education.

The level of illiteracy in the State for persons in the age group 15-35 years comes to 50 per cent. This situation is more serious in rural areas, females, scheduled castes and scheduled tribes, in the age group of 36 and above and backward regions like Panchmahals (78 per cent), Broach (77 per cent), Banaskantha (66 per cent), Kutch (58 per cent), etc.

4. Adult Education

Prof. D.T. Lakdawala, then Deputy Chairman of the Planning Commission in 1978, explored the need for a separate policy for formal schooling as well as for non-formal education like adult education to increase the objective of universalisation of primary schools and increasing level of literacy at national level.

Keeping an eye on operational aspects of the adult education programme in Gujarat following constraints are observed: lakh of understanding about the adult education programme in the community, lack of adequate teaching habit and method, lack of learning habit and method among learners and lack of proper classroom situation.

Hence, it would be a miracle task of 100 million illustrates in the age group 15-35 to make them literate within five years (1978-79 to 1982-83). This situation is more alarming in case of Kutch, Banaskantha, Panchmahals, Dangs; etc.

5. Case for Priority

It is clear that achievement towards universalisation of primary education is far from a desired level. From the existing educational system there is no hope to get cent per cent literacy even by the early few decades of the next century in the State. It is more alarming in case of socially and economically backward regions, scheduled castes and scheduled tribes, famale community.

There is a strong need for some structural changes or drastic steps at different stages of educational planning, particularly at decision making at allocation of the resources and at the utilisation of resources in the State. Top priority has to be given it if targets of universalisation of primary education and literacy are to be achieved.

4

Adult Education

Education is an important instrument for enlarging social order, based on the values of socio-economic justice and equal opportunities to all, and accelerating economic growth and technological improvements. Literacy and education impart functionality and social awareness which ultimately generate better understanding, skill formation and civilised manner of a society.

Since the formation of Gujarat as a separate State in May 1960, its population has increased from 206 lakhs in 1961 to 340 lakhs in 1981. Corresponding to the increase in population, the number of literate persons has increased from 63 lakhs in 1961 to 149 lakhs in 1981.

The overall literacy rate increased from 30.3 per cent in 1961 to 43. 8 per cent in 1981. But the increasing population pressure has not been keeping pace with the literacy rate. As a result, the number of illiterate persons increased from 143. 8 lakhs in 1961 to 191 lakhs in 1981. This situation is more serious in case of female population, scheduled castes, scheduled tribes, and in the rural areas of the State like Dangs, Kutch, Panchmahals, Banaskantha, Sabarkantha, Junagadh, Surendranagar, Bhavnagar, Broach, Jamnagar and Amreli as compared to counterparts. The situation of adult illiterates is more serious in the districts of Gujarat, particularly in above-mentioned areas where around two-thirds population is illiterate.

1. Adult Education Programme

In view of this, Gujarat under the National Adult Education Programme (NAEP), launched an adult education programme (AEP) in January 1978. The specific purpose of the programme was to impart literacy, social awareness and functionality particularly in the target groups of persons belonging to socially and economically deprived sections of society. Here an attempt is made to know at what extent they have derived the benefits from the AEP in Gujarat? What are the areas of weaknesses? What are the factors responsible for that?

The attempt is based on qualitative and quantitative information collected through the survey conducted with the help of structured questionnaires relating to various components of Adult Education Classes (AECs) under the per-announced visits and, intensive discussion on the major components of AECs with the persons involved in AEP under the un-announced visits. In all, 221 AECs (10 per cent of total 2,210 AECs in 1981) were visited, considering their various components, like classroom situation, instructors, present learners, drop-outs, supervisors, project officers, potential learners, physical environment and community support.

2. Profile of AECs and Learners

The profile of AECs reveals that they are highly concentrated (more than 4/5th AECs) in the rural areas, male-adult learners of weaker sections of society. The AECs are running in the evening time, *i.e.* 8 p.m. to 10 p.m. The socio-economic profile of learners conforms that 90 per cent AEP has reached (90 out of 100 AECs) to the target groups of society in terms of age group (15-35 years), backward communities (SC, ST and other educationally and socially backward communities), and lower strata of occupations, like agricultural landless labourers, casual workers and rural artisans.

3. Regularity of Classes and Attendance

The extent of regularity in running of AECs is judged on the basis of extent of actual classes held to the total maximum classes to be held. According to the class registers, the classes have held at 90 per cent, according to the instructors, the classes have held between 60 to 70 per cent, and according to the present learners the classes have held between 30 to 40 per cent. Reasons advanced for a low rate of regularity in classes are associated with lack of effective interest among instructors to run the classes due to low honorarium, compulsion from the employers or authorities to run the classes; irregularity and low attendance of learners; lack of effective supervision of AECs; irregular and inadequate learning materials at early stage of classes.

As per the norm fixed by the Government of India, one AEC consists of at least 30 learners. Each AECs record (register) shows the strength of 30 learners. However, the actual presence of learners as per the class registers comes to 27 out of 30 learners. As per our unannounced visits the presence of learners was observed between 2 and 5 out of 30 learners, that too we could locate the learners after several efforts. According to the instructors, it is a difficult task to collect 30 learners, as per the norm fixed by the Central Government, for starting a class.

To start an AEC, on an average 20 learners can be managed. Moreover, names of learners (at least 10 out of 30 learners) are only "on the paper". Further, it is noticed that attendance gradually declines with passes of time. It becomes more serious after completing the first quarter of AECs.

As for the learners who left the AECs before completing the specific courses, it is observed that the rate of drop-out is very high. It varies from 3 per cent as per the class registers to 33 per cent as per present learners to whom we met under our unannounced visits. The drop-out rate is much higher among learners coming from weaker sections like SC, ST, agricultural landless labourers who generally face economic hardships.

4. Learners' Performance

It is observed that learners having some schooling background have more satisfactory knowledge in literacy than social awareness and functionality components of the NAEP. Performance in case of learners not having any schooling background is found 'so-so' in literacy. Moreover, they have a negligible knowledge or performance in social awareness and functionality. The extent of performance was judged on the basis of literacy test in reading, writing and arithmetics. The social awareness and functionality were examined on the basis of learners' knowledge about bonded labour law, minimum wage rate, voting right, prohibition, dowry system, untouchability, family planning, etc.

Reasons for the low level of knowledge or performance in the basic components of NAEP or AEP is associated with irregularity in attendance of learners in class; ineffective approach of instructors for delivering the knowledge about social awareness and functionality lack of field visits to various developmental programmes; and inadequate teaching and learning materials according to local needs and requirements which can generate interest among learners.

5. Teaching and Learning Materials

It is observed AECs can function more regularly during the first quarter of the duration of the programme or course but the teaching and learning materials are generally not available during that period. As a result, extent of utility of materials declines substantially. If the learning and teaching materials are available in adequate quantity and in time then it may also reduce the learners' irregularity in the classes and the drop-outs from the AECs on the one hand and may increase the performance level of learners in literacy, social awareness and functionality on the other.

Yet another consideration is relevance of learning and teaching materials based on the local or learners' needs for creating a favourable environment among learners to retain them in the class and to make them aware for deriving the benefits from the various government schemes. At macro or broad level (Gujarat State Level), the State Resource Centre (SRC) of Gujarat Vidyapeeth has done excellent work in preparation and production of teaching and learning materials but the task of translation through considering local needs is still to be completed. A serious constraint regarding the SRC's work is that it does not have control over distribution of teaching and learning materials among instructors and learners.

6. Organisation and Supervision

Instructor, supervisor and Project officer are key persons for effective organisation and supervision of ACEs. An instructor is a teacher of literacy; initiator of discussion for generating awareness and functionality; mobiliser of resources; leader-*cum*-organiser of cultural and recreational programmes; recorder of the process of changes in learning and manager of the AEC. To meet these requirments he must be competent in knowledge, skills, attitudes and values. In fact, he gets only Rs. 50 a month for all these functions which is substantially low.

A supervisor is expected to guide and support the work of a cluster of about 30 AECs. Project officer is supposed to look after 100 AECs particularly in areas of instructors' training and supervision of AECs, management of agencies and creation of community relations.

It is observed that the supervisor and project officer, hardly pay any functional visit to AEC in a quarter. As a result, the AEP lacks strong community support and effective organisation of AECs.

7. Physical Environment

The environmental issues are observed in forms of physical environment of AECs and issues relating to learners in the AECs. It is observed that AECs running in primary schools have at least desirable sitting facility, lighting arrangement, drinking water supply and sanitation. While AECs running in the Instructors' houses are mostly lacking these facilities. The environmental issues relating to learners indicate a high level of heterogeneity in age, variation in occupations and differences in social strata. Their accumulated experiences, skills, knowledge and opinions are observed in varying nature with their age, occupations and social strata. In this situation, it is difficult for an instructor to put them into a most adjustable environment by using learning and teaching materials prepared by the SRC in a "macro-framework".

The above observations indicates that major problems involved in AEP in Gujarat are:

—Irregularity of learners throughout the duration of AECs. It is much more with passage of time. Both these two issues are interrelated.

—Lack of availability of teaching and learning materials in adequate and in time.

—Lack of basic amenities, like sitting place light and other physical environment.

—Lack of frequent and effective visits of supervisors or project officers in the context of the above-mentioned areas.

—Lack of intensive training to instructors by supervisors or project officers particularly in the context of social awareness and functionality.

—Mobilisation of community support is also the need of hour.

All these problems require an extensive and intensive attention for formulation of a well-integrated policy and action towards translation of the policy in the "real sense". It can be done by involving extensive experiences of various institutions and voluntary agencies, like SRC, Gujarat Vidyapeeth, Ahmedabad Study Action Group, etc. existing in the State.

5

Educating the Poor and Backward

The thinking on economic growth has percolated down to the poor and backward. Regions mostly inhabited by the poor and backward are to be identified and developmental efforts should emphasise more on such regions. Since the poor hardly possess physical assets worth the name, by investing in their education and health, their capability to work can be enhanced and consequently their earning capacity and levels of living. Precisely this appears to be the rationale for the inclusion of elementary education in the Minimum Needs Programme of the Gujart State.[1] Planners are more concerned about the education received by the poor and backward.

On what does the education received by the poor children depend? It is supposed to depend on three things[2]. First is accessibility. Second is the use of schooling facilities. Do their parents send them to schools or are they allowed or encouraged to drop-out? And the last one is the quality of education that school provides.

Assuming that accessibility is no longer a problem, then

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1. Government of Gujarat, *Sixth Five Year Plan : 1980-85 (Draft)*.
2. World Bank, *World Development Report*, 1980.

given the quality of education and the value perception of parents, there should hardly be any variation in the proportion of children enrolled in schools and the drop-out or the wastage rate. What is the extent of variation in two ratios? If the extent of variation is quite significant, then the qualifying phrase, given the quality of education and the value perception of parents, loses much of its relevance. The questions that arise in this context are: What are the indicators of the quality of education? On what does the 'value' attached by parents to their children's education depend? Some of the indicators of the quality of education are : (*i*) single-teacher schools,[3] (*ii*) trained teachers, (*iii*) pupil-teacher ratio[4], (*iv*) availability of physical facilities in schools like water supply, sanitation, compound wall, electrification, etc., and (*v*) per pupil expenditure. 'Value' attached to the education of the children by their parents depends largely on whether parents are literate. Repetition of classes and early drop-out may be the result of excessively high promotion standards for the students of first and second grades. Attendance rate, if at all any significance be attached to the statistics, can be said to have influenced the enrolment as well as wastage rates. The factor age-heterogeneity[5] (*i.e.* enrolment of students of over and below the appropriate age in a class) has also been figuring in the literature along with high promotion standards[6]. In this way, variations in the ratios—enrolment rate and the drop-out rate – can be explained in terms of the indicators of the 'quality' of education and the 'literacy status' of the parents.

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[3] Single-teacher schools remain closed when the teacher is absent. This weakens the elementary education system. It is, therefore, desirable that there should be no 'single-teacher school'. *Op. cit*, *Sixth Five-Year Plan (1980-85)*, Gujarat.

[4] While there are obvious practical limits to increasing classes much above 50, the research does suggest that for classes initially below 50, little will be lost if they are increased'. *Op. cit*., *World Development Report*, 1980, World Bank.

[5] At the primary level of education (classes I-V), of the total number of students enrolled, about 21 per cent were more than eleven years of age and 5 per cent were below six years of age in 1968-69.

[6] See: *op. cit. Sixth Five Year Plan* and *World Development Report*.

For our analysis the units of observation are the nineteen districts of Gujarat. Classification of districts in terms of their share in SC/ST population presents an interesting reading. Eight districts having proportion % of SC population higher than the State average (6.84) are: Ahmedabad (10.93), Surendranagar (10.39), Banaskantha (9.85), Kutch (9.44), Sabarkantha (8.60), Mehsana (8.96), Amreli (7.46), and Junagadh (7.39). Other four districts have the said proportion as high as that of the State.

The seven districts with ST population higher than the State average (13.99) are Dangs (93.46), Valsad (54.33), Surat (46.32), Bharuch (43.88), Panchmahals (38.55), Vadodara (23.89) and Sabarkantha (15.06).

Here in the beginning the gap in accessibility is ascertained. At the elementary level of education proximity to school is an overriding consideration rather than 'costs' of the provision of facility. Proximity is taken as the setting up of a school within the walking distance of 1 mile or 1.5 kms. from the house of a child. Then with the help of multiple linear regression technique, the variations in the enrolment ratio and the drop-out rate (two dependent variables) are examined taking 'quality' of education, adult literacy rate (non-economic factors) and persons below poverty line and agricultural labourers (economic factors) as the independent variables. Finally, the distance to be covered between regions in terms of accessibility, enrolment rate and retention rate and the quality of education, and the follow-up measures needed are highlighted.

1. Accessibility

In terms of accessibility, elementary education in Gujarat has made good progress. Out of 19 districts, more than two-thirds of the villages in two districts (Vadodara and Kutch) had primary schools in 1969-70. More than three-fourths of the villages in other three districts (Sabarkantha. Bharuch and Panchmahals) were served by primary schools. More than 90 per cent of the villages in the remaining 14 districts (*i.e.* about 74 per cent of the total number of districts) had primary schools.

Table 5.1

District-wise Information About Educational Facility and Other Indicators

S. No.	District	% of villages having Pri-school facility (within 1.5 Km)	Aggregate Adult (%)	Male Adult Literate (%)	Female Adult Literate (%)	Pupil—Teacher Ratio (Primary School)
1	Ahmedabad	99.2	65.2	77.3	51.1	35.5
2	Amreli	99.2	46.3	60.9	31.5	42.0
3	Kutch	91.7	41.5	51.6	31.7	36.9
4	Kheda	99.4	58.5	76.1	39.4	38.9
5	Jamnagar	98.7	45.2	58.0	31.3	37.8
6	Junagadh	98.2	43.0	58.2	26.8	39.1
7	Dangs	90.0	25.0	35.7	14.3	34.4
8	Panchmahals	96.7	33.6	50.6	15.7	36.0
9	Banaskantha	97.3	22.4	34.5	9.5	36.8
10	Bharuch	97.0	51.5	65.7	36.8	38.6
11	Bhavnagar	99.4	45.3	60.5	29.6	37.3
12	Mehsana	99.3	54.1	69.0	39.5	41.1
13	Rajkot	98.5	53.5	68.1	38.1	38.5
14	Vadodara	95.9	56.7	69.3	42.6	37.1
15	Valsad	96.9	53.4	65.4	41.5	40.0
16	Sabarkantha	97.4	43.7	63.5	23.4	37.4
17	Surat	97.5	55.3	66.6	43.4	46.0
18	Surendranagar	95.2	41.5	56.6	25.8	41.0
19	Gandhinagar	99.2	57.6	73.6	40.6	35.3
Gujarat—Mean		97.6	47.0	61.1	32.2	38.4
—Standard Deviation		1.8	10.9	11.4	10.6	2.7
—Coefficient of Variation (%)		1.8	23.2	18.2	32.9	7.0

(Contd.)

Table 5.1 (contd.)

S. No.	District	Percentage of Single Teachers School to total	Percentage of Trained Teachers to total	Percentage of Persons below poverty line	Percentage of Agri. Labourers to total
1	Ahmedadad	27.0	82.3	48.0	14.34
2	Amreli	26.0	73.3	51.0	21.69
3	Kutch	49.9	54.7	49.0	23.67
4	Kheda	29.6	84.7	47.0	23.82
5	Jamnagar	36.7	80.0	45.0	12.19
6	Junagadh	36.8	87.2	38.0	19.67
7	Dangs	76.9	76.2	75.0	20.15
8	Panchmahals	50.6	91.4	68.0	17.78
9	Banaskantha	61.8	80.0	65.0	16.20
10	Bharuch	40.5	80.0	74.0	47.44
11	Bhavnagar	37.2	96.1	51.0	21.68
12	Mehsana	21.0	87.6	55.0	24.32
13	Rajkot	30.6	74.9	41.0	14.33
14	Vadodara	31.8	93.9	74.0	32.29
15	Valsad	33.4	97.1	60.0	29.79
16	Sabarkantha	41.4	95.6	64.0	17.25
17	Surat	46.7	95.2	63.0	33.24
18	Surendranagar	43.3	90.8	42.0	29.86
19	Gandhinagar	15.7	80.1	59.0	25.82
	Gujarat—Mean	38.8	85.3	56.3	22.9
	—Standard Deviation	14.0	10.1	11.7	7.1
	—Coefficient of Variation (%)	36.1	11.8	20.8	39.7

(Contd.)

Table 5.1 (concld.)

S. No.	District	Enrolment Rate (%)			Drop-out Rate (%)
		Boys	Girls	Total	
1	Ahmedabad	103	83	94	62.15
2	Amreli	125	79	103	77.18
3	Kutch	85	45	66	68.43
4	Kheda	110	69	91	69.23
5	Jamnagar	98	60	80	66.74
6	Jungadh	98	59	79	65.95
7	Dangs	145	77	112	89.70
8	Panchmahals	98	44	70	80.98
9	Banaskantha	83	29	56	85.81
10	Bharuch	116	80	98	72.37
11	Bhavnagar	103	53	78	69.53
12	Mehsana	107	69	88	70.07
13	Rajkot	109	75	93	65.09
14	Vadodara	95	69	83	69.92
15	Valsad	135	81	96	71.93
16	Sabarkantha	113	67	90	74.34
17	Surat	95	78	87	75.49
18	Surendranagar	102	54	79	71.46
19	Gandhinagar	101	65	84	67.91
Gujarat—Mean		106.4	64.9	85.6	72.3
—Standard Deviation		15.1	14.6	12.8	7.0
—Coefficient of Variation (%)		14.2	22.5	15.0	9.7

Source : 1. *Population (Census—1971).*

2. *Perspective Plan of Gujarat (1974-1984)*, published by the Govt. of Gujarat.
3. *Handbook of Basic Statistics*, published by the Bureau of Economics & Statistics.
4. *An Estimate of Adult Literacy Rate in Gujarat*, published by the Gujarat Vidyapith.
5. G.V.S.N. Murty's estimates available at SPIESR, Ahmedabad.

Thus, the proportion of villages having primary schools ranges from more than two-thirds to nine-tenths, the latter dominating the scene.

Availability of schooling facility (Table 5.1) in their own habitation or within the walking distance norm gives a much better picture of accessibility. In all the nineteen districts, more than 90 per cent of people have had schooling facilities in their own habitation or within the stipulated distance of 1.5 kms. The lowest proportion of 91.70 per cent is for Kutch. The highest proportion of 99.40 per cent is for Bhavnagar and Kheda. Of the districts having overwhelming proportion of the tribal population, only Dangs had an edge over the State. Banaskantha, Sabarkantha, Bharuch and Surat districts are very close to the level obtained for the State. Panchmahals, Vadodara and Valsad, in this respect, appear to be slightly trailing behind.

The mean schooling facility within walking distance is estimated to be 97.6 per cent. The two measures, suggesting inequality in the provision of schooling facility in terms of 'distance' employed here, are the standard deviation and the coefficient of variation. We get the identical value of 1.8 per cent for both the measures. The values being low are suggestive of less skewed distribution of facilities for primary education.

According to the *Draft Sixth Five Year Plan*, 414 villages (2.3 per cent of the total number of villages), with the population size of 200 or more and without schooling facilities within a radius of 1.5 kms. have been covered by 1980-81. 711 villages (about 4 per cent of the total) with population less than 200 but more than 100 are to be covered by the specified schooling facilities during the Sixth Plan. This brings to light the extent of coverage in schooling facility already achived in Gujarat, which is in any case more than 96 per cent.

2. Enrolment of Children of the Age-group, 6-11 (Classes I-V):

Mean enrolment rate works out to 85.6 per cent—106.4

per cent for boys and 64.9 per cent for girls. Thus, the gap in the enrolment of children exists between sexes. The coefficient of variation, though the highest for girls (22.5 per cent), is not very high (15 per cent) for the combined enrolment ratio. However, variation in the highest and the lowest aggregate enrolment ratio is of the order of two times whereas in the case of girls, it is roughly three times. Of the districts, backward and tribal districts of Banaskantha (56 per cent), Kutch (66 per cent) and Panchmahals (70 per cent) compare very poorly in terms of enrolment ratio.

To what extent is the variation in proportion of children enrolled explained by such variables as the provision of schooling facility within the walking distance norm, adult literacy rate (15-35 age group), pupil-teacher ratio, the proportion of single-teacher schools, the proportion of trained teachers (non-economic variables), persons below poverty line and agricultural labourers (economic variables)? Regression results (Table 5.2) show that non-economic variables explain 37 per cent of the variation in the proportion of children enrolled (both sexes) in classes I-V. Same variables explain 60 per cent of variations in the enrolment ratio for girls. The result obtained is quite encouraging as the enrolment ratio for girls of the relevant age-group is about two-thirds of the aggregate enrolment ratio. Adult literacy rate (age group 15-35), provision of schooling facility and single-teacher schools—in that order, have come out significantly in terms of t-value.

We notice slight improvement in the explanatory power of the equation when the dependent variable (enrolment ratio) is regressed on non-economic and economic variables together. (Table 5.3). The values of $R^2=0.427$ and 0.641 for both sexes, confirm this. Two economic variables are statistically not significant, whereas two non-economic variables statistically significant are adult literacy rate (significant at 5% level) and the provision of schooling facility (significant at 5% level) in case of girls. For both the sexes, schooling facility variable is significant at 5%. Results mainly show that to step up enrolment there should be an adequate provision of schooling

Table 5.2

Regression Results : Non-Economic Variables

S. No.	Constant (a)	Percentage of Pri-School Facility (B_1)	Pereentage of Adult Literacy (B_2)	Pupil-Teacher Ratio (B_3)	Percentage of Single Teacher to Total (B_4)	Percentage of Trained Teacher to Total (B_5)	R^2	F-Ratio
1	Enrolment Rate (Girls) —325.9112	2.7696*	1.4430***	0.5168	0.7315	0.0218		
		SE (1.6371)	(0.4237)	(1.0845)	(0.3406)	(0.3056)	0.6038**	3.9617
		T (1.6917)	(3.4057)	(0.5411)	(0.2148)	(0.0748)		
2	Enrolment Rate (B+G) — 323.2137	3.4266**	0.9002**	0.2083	0.0407*	— 0.0102		
		SE (1.8409)	(0.4764)	(1.2194)	(0.3830)	(0.3436)	0.3676	1.5112
		T (1.8614)	(1.8894)	(0.1708)	(1.6727)	(— 0.0296)		

SE=Standard Errors, T=T Value, *Significant 10%, **Significant 5%, ***Significant 1%

Table 5.3

Regression Results : Economic and Non-Economic Variables

S. No.	Constant (a)	Percentage of Primary School Facility (B$_1$)	Percentage of Adult Literacy (B$_2$)	Pupil-Teacher Ratio (B$_3$)	Percentage of Single Teacher Schools to Total (B$_4$)	Percentage of Trained Teachers to Total (B$_5$)	Percentage of Persons below Poverty Line (B$_6$)	Percentage of Agri. Labourers (B$_7$)	R^2	F-Ratio
1 Enrolment Rate (Girls)	— 365.1094	3.2385**	1.2548**	0.6751	0.5719*	—0.0932	0.1838	0.2097	0.6408	2.8034
		SE (1.7850)	(0.4769)	(1.3965)	(0.3952)	(0.3669)	(0.3460)	(0.4404)		
		T (1.8128)	(2.6310)	(0.4835)	(1.4473)	(− 0.2613)	(0.5313)	(0.4762)		
2 Enrolment Rate (Aggregated)	— 367.4854	4.0604**	0.6750	—0.0168	0.5076	—0.0170	0.0105	0.3763	0.4271	1.1716
		SE (2.0065)	(0.5361)	(1.5697)	(0.4442)	(0.4012)	(0.3889)	(0.4950)		
		T (2.0237)	(1.2591)	(—0.0107)	(1.1428)	(-—0.2110)	(0.2069)	(0.7602)		

SE=Standard Errors, T=T-Value, *=10% Significant, **=5% Significant, ***=1% Significant.

facilities on the one hand, and making more adult illiterates literate on the other. Of the two variables the latter-namely adult literacy rate—not only varies by sexes (average literacy rate for females is just half that for males), but gives a more unequal distribution revealed by the value of co-efficient of variation (0.23 as against 0.09 for schooling facility). Tribal districts like Dangs, Panchmahals and Sabarkantha have adult literacy rates much below the State average. Of the districts accounting for a higher proportion of SC population than the State average, the following five—Surendranagar, Sabarkantha, Banaskantha, Junagadh and Kutch—have the literacy rate lower than the State. Kutch, Junagadh, Panchmahals, Banaskantha and Surendranagar enrolled fewer children of age group 6·11. In terms of schooling facility on average they trail behind the State just by 2.4 per cent as against by 22.6 per cent with respect to adult literacy rate. Moreover, enrolment among girls and adult literacy rate seem to be highly correlated as revealed by the value (0.636) of correlation coefficient.

Even more important than the enrolment of children in schools is their retention till they complete the prescribed miniumum years of schooling—5 or 7 years—as the case may be. Persistent high drop-out rate and its heavy incidence initially (*i.e.* from class I to II) are the two more disturbing facts, as they are likely to swell the number of adult illiterates in course of time. Furthermore, retaining them for a longer education raises the effectiveness of expenditure on formal education.

Drop out rate[7] for each district of Gujarat at the primary level of education (classes I-V, age group 6-11) estimated here is the difference between the number of pupils enrolled in Class I in any one year (here in 1968-69) and in Class V five years hence (i.e. in 1972-73) expressed as a proportion of the base-year enrolment (*i.e.* enrolment in class). Of the pupils enrolled in Class I in 1968-69, only 28.88% were able to reach class V in 1972-73, indicating 71.12% drop-out rate. It ranges from two-thirds to four-fifths.

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[7] No attempt is made here to distinguish between droup-out and stagnation. It is safe to assume that 'repeaters' normally drop out.

The incidence of droup-out varies from class to class. 47% of pupils in class I failed to go to class II, 21% in class II failed to go to class III and 9.4% could not go to class IV. Of those in class IV, nearly 24% could not reach class V.

The variation in drop-out rate is explained first by taking only non-economic variables spelt out earlier, and secondly by combining non-economic with economic variables.

The regression equation (Table 4.4) shows that non-economic variables together explain nearly 75% of the variations in the drop-out rate ($R^2=0.75$). The only variable which has turned out significant (at 10% significant level) is the single teacher schools. The mean value of single-teacher schools is 38.8 per cent and the value of coefficient of variation is also quite high at 36.1 per cent. Drop-out rate and the proportion of single-teacher schools are positively correlated—the value of coefficient of correlation being 0.766. Single-teacher schools influences the drop-out rate by influencing attendance rate. Districts which rank very low on the basis of average attendance seem to have high ranks in terms of single-teacher schools. This holds especially for predominantly tribal and backward districts like Dangs, Panchmahals, Banaskantha and Bharuch.

When the drop-out rate is regressed (Table 5.5) both on economic and non-economic variables, the explanatory power of the equation on doubt improves (R^2-0.918). The improvement is of the order of 17 per cent. However, the variables other than single-teacher schools have come out importantly. Adult literacy rate and persons below poverty line are significant at 1% level. Pupil-teacher ratio is significant at 5% level, whereas schooling facility at 10% level. Of these variables again, the first two-adult literacy rate and persons below poverty line-are highly correlated to droup out rate. The respective values are −0.780 and −.0642. The drop-out rate is negatively correlated to the proportion of agricultural labourers.

Table 5.4

Regression Results : Non-Economic Variables

	a	B_1	B_2	B_3	B_4	B_5	R^2
Y_1	—1.2433	0.5998	—0.2781	0.1647	0.2574*	0.1382	0.7468
S.E		(0.6221)	(0.1610)	(0.4121)	(0.1294)	(0.1161)	
T. Value		(0.9541)	(—0.0173)	(0.3996)	(1.989)	(1.1909)	

Note : *Significant level at 10%

B_1=Schooling facility, B_2=Adult literacy rate, B_3=Pupil-Teacher Ratio

B_4=Single-Teacher Schools, B_5=Trained Teachers, Y_1=Wastage Rate.

Table 5.5

Regression Results : Economic and Non-Economic Factors

	a	B_1	B_2	B_3	B_4	B_5	B_6	B_7	R^2
Y_1	—29.6910	0.7607*	—0.3938***	0.7666**	0.0634	−0.0370	0.3438***	—0.0780	0.9180
	SE	(0.4054)	(0.1083)	(0.0317)	(0.0897)	(0.0811)	(0.0786)	(0.1000)	
	T-Value	(1.8764)	(−3.6354)	(2.4173)	(0.7061)	(—0.4569)	(4.3759)	(—0.7869)	

Note : *Significant level at 10%, **Significant level at 5%, ***Significant level at 1%.
B_1=School facility, B_2=Adult literacy rate, B_3=Pupil-teacher ratio, B_4=Single-teacher schools, B_5=Trained teacher, B_6=Persons below poverty line, B_7=Agricultural labourers, Y_1=Wastage rate.

(—0.632). The fact that non-economic variables alone account for about 75% of the variation in drop-out rate is in itself quite revealing.

The whole analysis finally boils down to this, that the 'drop-out phenomenon is not simple economic' in character. Non-economic factors are as important as economic. On the basis of our analysis, the solution to the perennial problem of drop-out lies in the promotion of literacy among adults and in the qualitative improvement of formal schooling itself, over and above the removal of poverty. Promoting literacy among adults, by reducing drop-out rate, has definitely to play an important role in building up human capital—the only productive asset the poor will acquire consequently. The formal and non-formal education is this sense are complementary rather than competitive as supposed to be.[8]

3. **Summing up**

The provision of schooling facility at the elementary level in Gujarat is no more an issue that should concern planners right now. Even the proportion of children enrolled in elementary schools appears to be quite high, though sex-wise differences persists.

The district-wise variation in enrolment ratio, to the extent of roughly 37 per cent (60 per cent, in case of girls) is explained jointly by variables, adult literacy rate, schooling facility, and single teacher schools.

Districts appear to be more unequal in drop-out rate. The perpetuation of drop-out rate for a long period of time thwarts the process of human capital formation by swelling the number of illiterate children first and illliterate adults later.

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[8] D.M. Pestonjee, S.N. Laharia and Deepti Dixit; *National Adult Education Programme in Rajasthan : Second Appraisal* (PSG Monograph-23) Indian Institute of Management, Ahemdabad.

The analysis of drop-out rate, both in terms of economic and non-economic factors, reveals the importance of 'non-economic' factors.

Districts have shown a good deal of variation especially in the proportion of single-teacher schools and in the adult literacy rates sex-wise. Districts characterised as tribal and backward have high drop-out rate, higher proportion of single-teacher schools and lower proportion of trained teachers. The gap in the 'quality' of education and literacy rates between districts explains the preponderance of drop-out rate. It is this gap that ought to be bridged at the earliest.

In future our efforts at raising the level of education of the poor or backward districts should be more in the direction of raising the quality of education and spreading literacy among adults. These efforts will ultimately strengthen the process of human capital formation promoting growth with distribution.

6

Growth, Productivity and Workforce in Indian Economy

The only lasting solution of unemployment problem in underdeveloped countries lies in creating additional employment opportunities through rapid economic development. It is felt in early fifties that rapid economic development is paradoxically the greatest cause of and the greatest cure even for technological unemployment in many developing and less developed countries.[1] On the contrary, a systematic plan for human capital development is important for creating social order based on the values of socio-economic justice, freedom and equal opportunity of all and thereby accelerating economic development and technological progress.[2] Unfortunately hardly any systematic recognition is given to the necessity of a plan for human capital formation in India on which the whole economiy is based.

Looking at the manpower planning since begining of the planning system in the Indian economy, the existing situation is far from satisfactory. A wide range of unemployment and underemployment can be observed in rural and urban areas, in traditional and modern economic activities and, among unskilled, semi-skilled and skilled persons[3]. In the absence of adequate manpower planning, imbalances between demand for and supply of manpower at different stages of formal and informal education and training are obvious. Apart from that, even in unsurfaced manpower planning, estimates of demand for and supply of manpower based on various assumptions, particularly, relating to the base year estimates of surplus, growth of output by different sectors of the economy, changes in stucture of output, extent of capital formation, technological change and factor intensities and certain other factors are also not taken into account correctly or properly. On the contrary, issue of manpower supply has been left with no effective estimates. The classical system of "supply creates its own demand" and/or competitive forces on the supply side and monopolistic forces on the demand side of labour market has created sizeable under-employment and unemployment among persons at different stages of formal and informal education and trainings in the country[4].

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[1] United Nations, *Measures for the Economic Development of Underdeveloped Countries*, New York, 1951, pp. 7 & 27.

[2] Government of India, Planning Commission, '*Third Five Year Plan*', p. 573.

In this situation it will be worthwhile to explore the micro-projections of the demand for and supply of manpower at different levels of formal and informal education and trainings for further effective manpower planning. For demand projection we require estimates of the base year data on employment and unemployment of skilled and unskilled manpower with reliable coverage; adjustments to correct for sub-optimality in base year employment particularly with reference to effective assessment of number of vacancies, structural imbalances and quantitative weaknesses of formal and informal education and training programmes and job experience; projection of the growth in demand evaluating growth and structural change in the economy, measurements of elasticity of demand with respect to change in output, wages and structure of skilled persons.

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[3] D.R. Veena—"Education, Manpower and Economic Growth", *'Unpublished Paper'*, SPIESR, Ahemdabad, 1977-78.

[4] D.R. Veena—*op. cit.*

For supply projection, we require estimates of the base year data on employment, unemployment and underemployment by levels of formal and informal education and trainings; gross addition from formal and informal education and training programmes and upgrading on the jobs, etc., wastage from migration, retirement, death, etc. labour force participation rates at different age groups and sex; adjustment for assumed changes in hours and intensity of work. For balancing demand and supply, we require adjustment of supply and demand to achieve balance of stock and flow in target year; minimization of costs of implied skill programmes and effective application of sensitivity analysis to derive policy conclusions.[5]

From methodological viewpoints and empirical evidence, some attempts have been made on major aspects of supply and demand for manpower at different stages of formal and informal education and training[6]. Here, attempt is made from the side of demand covering the following issues, such as structural change in growth and employment pattern; and effects of product mix and process mix technological changes on labour productivity and demand for manpower across different sectors of the economy.

Information pertaining to employment for different sectors of the economy under private and public establishments have been collected for the period of 1961—73 from the *Economic Surveys*[7]. The data on gross domestic product for the different sectors of the economy at the constant prices of 1961 have been collected for the same period from the *National*

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5. D.R. Veena and R.D. Desai, "A Need for Dimension in Indian Education System". *A paper presented in Ninth Gujarat Economic Conference*', Dohad, October, 1977.
6. D.R. Veena, *Role of Education in Economic Development of an Under-developed Economy : With special reference to Gujarat*, Ph.D. Thesis, Gujarat University, Ahemdabad, 1976.
7. Government of India, *Economic Surveys (for various years)*, New **Delhi.**

Accounts Statistics[8]. The data on gross domestic capital formation at the constant prices of 1961 have been collected for the same period from the *National Accounts Statistics*.[9] Then figures on employment and gross domestic products have been classified according to homogeneous sectors.

1. Present Pattern and Forecasting of Gross Domestic Products Across Sectors

The overall gross domestic product has grown at the annual rate of 3.39 per cent during the period 1961—73 which varies from 10.06 per cent in generation of electricity, gas and water supply to 1.87 per cent in agriculture and allied activities. The growth of mining and quarries, manufacturing and trade has been at the rate of around 4 per cent; growth of construction, transport, storage and communication and other services has been at the rate of around 5 per cent. The year-wise indices of growth pattern accross different sectors of the economy are presented in Table 6.1.

Looking at the important problems relating to reduction in inequality or poverty weightage (3% p.a.) has been given to wage goods or agricultural and allied activities. Accordingly gross domestic products across different sectors of the economy have been projected for the years 1980, 1985 and 1990. The sector-wise position of gross domestic products is presented in Table 6.2.

2. Employment Patterns

The growth patterns of labour force across different sectors of the economy for period 1961—73 are presented in Table 6.1. It can be seen from the Table that at an aggregate level labour force has increased by 3.36 per cent per annum which varies from 8.30 per cent per annum in trade and commerce

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[8] Government of India, *National Accounts Statistics*, New Delhi, 1974-75.

[9] Government of India, *op. cit.*

Table 6.1

Sector-wise Indices and Growth Rates of Gross Domestic Product, Employment, and Labour Productivity

S. No.	Sectors	Indices for 1973 with 1961=100			Compound Growth Rate per annum (1961-1973)		
		GDP	Employment	Productivity	GDP	Employment	Productivity
1	Agriculture and Hunting etc.	123.3	103.7	87.6	1.87	1.78	0.13
2	Mining and Quarrying	165.7	101.2	170.4	4.42	—0.87	5.33
3	Manufacturing	163.8	149.5	114.2	4.18	2.93	1.22
4	Electricity, gas and water supply	314.7	204.2	165.7	10.06	6.17	3.93
5	Constrution	171.4	141.5	124.6	5.38	1.94	3.37
6	Wholesale and Retail trade	159.2	286.2	57.1	4.06	8.30	—3.91
7	Transport, stroage and Communication	180.4	132.0	143.5	5.25	2.14	3.04
8	Financing, Real Estate and Insurance	147.6	—	—	3.25	—	--
9	Community, Social and personal services	185.2	177.6	109.3	5.53	4.56	0.93
	Total	146.1		92.4	3.39	3.36	0.02

Table 6.2

Sector-wise Projections of Employment and Gross Domestic Product : 1980, 1985 and 1990

S. No.	Sectors	Gross Domestic Product (Rs. in crores)			(Empolyment (In lakh)		
		1980	1985	1990	1980	1985	1990
1	Agriculture and Hunting etc.	8,909.8	9,775.6	10,725.4	12.575	13.738	15.009
2	Mining and Quarrying	312.6	387.9	481.5	6.462	6.196	5.922
3	Manufacturing	4,219.7	5,179.8	6,358.2	62.022	71.667	82.812
4	Electricity, gas and water supply	450.0	726.7	1,173.7	8.196	11.056	14.915
5	Construction	1,590.0	2,065.9	2,684.2	13.651	15.031	16.550
6	Wholesale and Retail trade	2,791.8	3,406.5	4,156.5	12.703	18.925	28.194
7	Transport, storage and communication	1,562.5	2,018.1	2,606.6	27.630	30.720	34.155
8	Financing, Real Estate and Insurance	1,056.8	1,239.9	1,454.7	—	—	—
9	Community, social and personal services	40,413.3	52,905.9	69,260.7	97.272	121.582	151.967
	Total	24,394.7	28,814.6	34,035.3	237.300	279.991	330.362

to −0.87 per cent per annum in mining and quarries. Taking projected output with reduction in inequality or poverty and projected labour productivity across different sectors of the economy, the requirements of work force have been worked out for the period of 1980, 1985 and 1990[10]. The estimates of work force across different sectors are presented in Table 6.2.

3. Trends in Productivity:

The labour productivity[11] has been defined in usual and general form, *viz* $P=X/L$, where P stands for labour productivity, X for output and L for labour force. The trends of labour productivity across different sectors have been presented in Table 6.1. It can be observed from the Table that at an aggregate level labour productivity has increased at the annual growth rate of 0.02 per cent per annum. The increasing trends in productivity are observed in mining and quarries (5.33%), electricity, gas and water supply (3.93%), construction (3.37%), transport and communication (3.04%), manufacturing (1.22%) and other services (0.93%). The declining trends of labour productivity are observed in trade and commerce (−3.91%). The almost constant labour productivity is observed in agriculture and allied activities (0.13%).

For further projections of labour productivity across different sectors of the economy, particularly for those sectors where the change in the extent of productivity is zero or nearer to zero, the changes in per annum productivity is assumed to have reached a satisfactory level. The decreasing trend in productivity is unrealistic and may be due to the heterogeneous nature of the data and information about the sectors of the economy. However, we have used differential growth rates of labour productivity *viz.* 1 per cent for agricultural and allied activities; 2 per cent for manufacturing; 3 per cent for electricity, gas and water supply, construction, transport and storage and 5 per cent for mining and quarries in further accounted period, *i.e.* up to 1990.[12]

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[10] Data on employment relating to real estates, insurance, etc., were not available in time series, therefore employment figures for there sectors could not be projected.

[11] *See* for detailed discussion—G.C. Beri, "Concept and Measurement of Labour Productivity", *Vishleshan*; Vol. II, No. 1, pp. 24-30.

4. Relationship between Gross Domestic Product, Labour Force and Productivity

Looking at the patterns of employment, gross domestic product and productivity across different sectors of the economy it can be broadly observed that at an aggregate level gross domestic product has increased by 3.39 per cent per annum, while employment at the rate of 3.36 per cent per annum and labour productivity at the rate of 0.02 per cent per annum. It implies that growth pattern of employment is closely related to the growth of gross domestic product. It lies slightly lower than gross domestic product because of slightly upward changes in labour productivity. Statistically, the coefficient of correlation between growth rate of gross domestic product and growth rate of employment is found to be 0.963 and between growth rate of employment and growth rate of labour productivity at an aggregate level is found to be —0.248. It implies that growth in employment is significantly and directly related to gross domestic product and inversely but insignificantly related with productivity.

From the analysis of relative change in gross domestic product, employment and labour productivity across different sectors of the economy from year to year and their growth rates it can be observed that while growth of gross domestic product at an aggregate level is found to be 2.96 per cent per annum, that of employment is at the rate of 3.54 per cent per annum and labour productivity at the rate of — 0.51 per cent per annum. It clearly shows that the growth of relative change in employment is higher than the growth of relative change in gross domestic product which can be attributed to labour productivity. Thus one can conclusively say that absolute and relative changes in employment are directly conditioned by absolute and relative changes in gross domestic product after correcting for changes in labour productivity.

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[12] With the assumption of linear rise in labour productivity in each sector of the economy. However, it has its own limitation regarding policy implications.

5. Technological Effects

Change in labour productivity is directly related to change in technology. The technological change can be seen in the forms of pcoduct-mix and process-mix innovation which depend upon nature of products, skill composition of working force, extent of capital intensity, innovations in organization and management and market channels.[13] Expansion of these segments or factors requires substantial increase in level of investment or capital formation. Therefore, one can postulate the functional relationship between employment and capital formation. Using time series data on employment and gross domestic capital formation the linear variant of the function $E=f(K)$ where E stands for employment and K for capital formation, has been fitted. The R^2 value (.91) reveals that the relation between them is significant even at 1 per cent level.

6. Manpower Forecasting:

Taking structural change in gross domestic product in the economy and giving assumed weightage to wage goods or agricultural and related activities and, taking assumed differential labour productivity rate across different sectors of the economy, total and additional requirements of the manpower have been worked out for the period 1980, 1985 and 1990 (Table 6.2). The replacement of workforce due to death, retirements, etc; has been worked out at the rate of 2 per cent to total required workforce across different sectors of the economy. The total net addditional, *i.e.* new additional requirements *plus* replacement, across different sectors of the economy has been presented in Table 6.3. From this Table it emerges that total net additional requirements of the manpower will be 43.545 lakh in between 1980—85, 51.378 lakh in between 1985—90 and 94.923 lakh in between 1980—90.

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[13] J. Schumpeter, *History of Economic Analysis*, New York, 1954, p. 619. Regarding problems of change in technology, See United Nations, *op. cit.*, p. 28 & 30. Ragner Nurkse *Problems of Capita Formation in Underdeveloped Countries*, Oxford, 1955, p. 3.

Table 6.3

Total Additional Employment Measurements

(In lakhs)

Period	Additional Employment Requirements	Replacement of Col. 2 (On 2% basis)	Total Net Additional Requirements (2÷3)
1980-1985	42.691	0.854	43.545
1985-1990	50.371	1.007	51.378
1980-1990	93.062	1.861	94.923

7. Summing Up

Changes in employment across different sectors of the economy are observed to be not entirely corresponding to the proportionate changes in gross domestic products. They are in correspondence to both changes in products as well as productivity. Capital and employment also are positively related.

Assuming sector-wise rise in labour productivity at lower level and drastic structural change in output in view of reduction in inequality or poverty and, giving appropriate weightage to agricultural and allied activities, employment opportunities cannot be increased more than 8 lakhs per annum on an average.

Looking at the relationship between employment potentiality and capital formation in the Indian Economy, it can be safely concluded that it is difficult to reach the stage of full employment given by the end of 1990.

7

Manpower Projection—Techniques and Their Application

Manpower planning—being an important part of the over all economic development—is essential for an optimum allocation of available human resources in a country. Shortage of critical skills or over-supply of manpower at different stages of skills—education and training—are some important components of the manpower and educational planning. Manpower projections have short and long-term implications, particularly in view of the existing magnitudes of supply of manpower at different levels of skills on the one hand and for drawing the short- and long-term dimensions of structural changes in manpower due to several dominant factors like technological changes, changes in output structure and product—mix technological issues at the various stages of production processes on the other. Manpower projections help to understand 'this much' manpower can generate 'that much' output under given constraints of (*a*) introduction of technology, (*b*) quality of labour, and (*c*) changes in utilization pattern of manpower.

An effective manpower projections policy should be based on the sound and effective recruitment programmes among various industries. This suggests that the selection of appropriate strategies for utilization, control and maintenance of manpower should be viewed before projections of manpower. The forecasting of manpower requirements can be thus viewed in the following manner: (*a*) aggregation of forecasts made by individual units of the industries; (*b*) determination on the basis of the future expansion plans of the industries; and (*c*) extrapolation of past trend in employment. Considering this background, here an attempt has been made to utilize various techniques for projections of manpower by occupations and by educational levels in highly urbanised and industrialized city, namely, Ahmedabad. The choice of Amedabad city has been made due to several reasons : (*i*) to understand the existing nature of manpower by skills in various economic activities for that no single study is available at present, and (*ii*) to know the extent of technological change in different economic activities of the city if such study is available for two points of time.

1. Methodology

Various techniques developed and widely used by earlier researchers for projections of manpower across occupations and eductional levels can be classified under following three categories : (*a*) Fixed Requirement Approach, (*b*) Labour Productivity Approach, and (*c*) Occupation and Education Matrix Approach.

1.1. *Fixed Requirement Approach*

This simple approach accounts two techniques, *viz*, simple input-output model and simple homogeneous production function technique. Under this criterion manpower projections can be made for each sector or for all the sectors of an economy through using a fixed requirement of each category of skill of manpower per rupee worth of output in each of sector or all the sectors of an economy. Assumption of the technique is that the labour co-efficients are constant over the period of time. The estimation of manpower projection with the help of this technique can be made in the following manner :

$$\begin{aligned} \text{lijt} &= \text{Lijt}/\text{Xjt} && (1.1) \\ \text{Dijt} &= \text{lijt Xjt}+1 && (1.2) \\ \text{Dijt}+1 &= \text{Lijt }(\text{Xjt} + \triangle\text{ Xjt}+1) && (1.3) \\ &= \text{lijt Xjt}+\text{lijt} \triangle \text{ Xjt}+1 && (1.4) \\ &= \text{Dijt}+1 \triangle \text{ Dijt}+1 && (1.5) \end{aligned}$$

Where :

$lijt$ = Labour productivity in ith occupation in jth activity in the time t.

$Lijt$ = Number of workers employed in ith occupation in jth activity in time t.

Xjt = Value of output of jth activity in time t.

$Xjt+1$ = Value of output of jth activity in time t+1.

$Dijt$ = Demand for manpower in ith occupation in jth activity in time t.

$Dijt+1$ = Requirement or demand for manpower in ith occupation in jth activity in time t+1.

$\Delta Xjt+1 = Xjt+1 - Xjt$ = Value of additional output of jth activity in time t+1.

Total demand for manpower for all sectors of the economy in ith occupation can be derived by.

$$Dit+1 = \sum_{j=1}^{m} D_1\,jt+1 + D_2\,jt+1 + \ldots + Dmjt+1 \qquad (1.6)$$

$$j=1, 2, 3 \ldots m.$$

Requirement of all types of manpower in jth activity in time t+1 can be derived by:

$$Djt+1 = \sum_{i=1}^{n} Dijt+1$$

$$= \sum_{i=1}^{n} lijt\ Xjt+1 \qquad (1.7)$$

$$i=1, 2, 3, \ldots n,$$

Total requirement of all types of manpower in all types of activities in time t+1 can be derived by:

$$Dt+1=\sum_{i=1}^{n}\sum_{j=1}^{m} lijt \quad Xijt+1 \tag{1.8}$$

$i=1, 2, 3, \ldots n.$

$j=1, 2, 3, \ldots m.$

Additional requirement of manpower by each skill and activity can be derived by:

$$\triangle \; Dijt+1=Dijt+1-Dijt \tag{1.9}$$

For total additional requirement of manpower at all levels of skills and in all sectors of the economy may be estimated by :

$$\triangle \; Dt+1 =\sum_{i=1}^{n}\sum_{j=1}^{m} \triangle \; Dijt+1 \tag{1.10}$$

This method is based on two types of information (*a*) value of output; and (*b*) physical number of employed persons. This method has its own limitations and implications. In case of value of output which is always available in two forms, *i.e.* gross output and net value added; and both in money or real quantity terms. If output is in quantity form then one can expect there will be no problem of effects of price changes in output. The value-form may be useful when there is a possibility of changes in prices of production. Hence the prices should be constant in spite of changes in production of commodity.

1.2 *Labour Productivity Approach*

In the fixed requirement approach it has been assumed that the labour co efficients do not change over the estimation period. In the labour productivity approach this restriction relaxed and the labour co-efficients are allowed to change through changes in labour productivity. Changes is the labour productivity are often the results of innovations in production technology techniques and improvement in organisation and administration or management. Hence, it is more reliable than previous one. According to this method demand for manpower is supposed to depend upon output factor. Estimation procedure is given below :

$$lijt=\frac{Xjt-2+Xjt-1+Xjt}{Lijt-2+Lijt-1+Lijt} \qquad (2.1)$$

$$Dijt+1=Xjt+1\ lijt \qquad (2.2)$$

Total requirement of manpower by skills and economic activities can be obtained by :

$$Dt+1\sum_{i=1}^{n}\sum_{j=1}^{m} Xjt+1\ lijt \qquad (2.3)$$

$$i=1, 2, 3, \ldots\ldots n.$$

$$j=1, 2, 3, \ldots\ldots m.$$

Production value can be projected by using growth rate (s) of output in each sector :

$$Xjt=(1+s)^{t}Xjo \qquad (2.4)$$

and, for the whole economy :

$$Xt=Xit+X2t+X3t+\ldots\ldots+Xm. \qquad (2.5)$$

or, $Xt=(1-s^{*})^{t}+Xo$ (2 5*a*)

And if the labour force, accounting labour productivity, is grownig in each and/or all the sectors of the economy by the certain growth rate (r) then demand for manpower by each skill in each sector can be derived by:

$$Dijt=(1+r)^{t}\ Djo \qquad (2.6)$$

and for the whole economy by each level of skill:

$$Dijt=Dilt+Di2t+Di3t+\ldots\ldots\ldots+Dimt \qquad (2.7)$$

or, $$Dit=(1+r^*)^t\ Dio \qquad (2.7a)$$

1.3 *Educational-Occupational Matrix*

Relationship between occupations and education depends on the assumption that education is necessary to perform a particular function. Education cultivates the mind of employed persons to produce required level and type of output. Due to increasing level of technological changes in each sector of an economy, particularly in developing countries, the composition of education and trainings and occupations also change and, accordingly the educational-occupational matrix will be changed. The extent of changes in the matrix also depends upon the extent of substitution between (*i*) occupation-wise changes in educational level; or (*ii*) educational level-wise changes in occupations in different sectors of the economy. Accordingly, *i.e.* accounting them, new occupational-educational matrix can be developed. Estimation procedure of the matrix is as follows :

For ith education in jth sector :

$$Dijt+1=lijt\ Xjt+1 \qquad (3.1)$$

For all types of educational levels and in all sectors of the economy:

$$\sum_{i=1}^{n}\sum_{j=1}^{m} Dijt=\sum_{i=1}^{n}\sum_{j=1}^{m} lij\ Xjt+1 \qquad (3.2)$$

The each method of projections of manpower by skills and activities has its limitations and implications. Hence, these methods are not complementary but are supplementary to each other to achieve the target of projections of manpower.

2. Data and Information Sources

For analysing the existing structure of workforce by occupations/skills and educational levels across economic activities of the city econony, the quantitative information have been collected from the various studies and sources, such as (*a*) *Facets of an Urban Economy*; *Economic Base Study of Ahemdabad* by S.P. Kashyap, R.S. Tiwari, D.R. Veena, (*b*) *Construction Labour Market : A Study in Ahmedabad by* K.K. Subrahamanian, D.R. Veena, B.K. Parikh; (*c*) *Informal-Sector of Ahemdabad City* by T.S. Papola; (*d*) Directorate of Employment, Manpower and Training, Government of Gujarat, and (*e*) *Population Census-1971*.

3. An Empircal Test Results

Ahmedabad is one of the major cities in India. Currently it accounts around 25 lakhs population. It generates around Rs. 600 crores worth of income per annum which comes to 14.3% to the total income of Gujarat State. It is highly industrialised city as it constitutes a substantial share of the workforce, (30%) to the total workforce in the manufacturing sector of the State economy. Looking at the major economic activities of the city, it can be classified in following manner: (*i*) Agricultural or agro-based activities (A_t); (*ii*) Manufacturing (A_m); (*iii*) Constuction (A_c); (*iv*) Trade and Commerce (A_t); (*v*) Transport and Communication (A_t^*); and (*vi*) Other services (A_o).

The highest share of products comes (Table 7.1) in case of manufacturing sectors (49.71%) followed by trade and commerce (23.75%), other services (14.56%), transport and communication (6.60%), and construction (4.84%). The lowest share of output is observed in agro-based economic activities (0.54%). By workforce, the contribution of manufacturing activities (47.47%) comes at the highest level followed by 'other' service (21.11%), trade and commerce (19.12%), transport and communication (7.24%), and construction (3.31%). The lowest share of workforce is observed in case of the agro-based activities (1.75%).

In connection with the productivity level across economic activities in the City (Table 7.1), the highest level of output per employed person is found in construction (Rs. 12,861), followed by trade and commerce (Rs. 10,922), manufacturing

Table 7.1

Distribution of Output and Employed Persons by Economic Activities in Ahmedabad City—1977

S. No.	Economic Activities	Value added (in crs.) (X)	Share (%)	Employed persons Nos. (L)	Share (%)	Co-efficients X/L	Co-efficients L/X
1	Agro-based activities (A_f)	2.9	0.54	10,614	1.75	2,732.24	.0003660
2	Manufacturing (A_m)	265.2	49.71	2,88,032	47.47	9,207.31	.0001085
3	Construction (A_c)	25.8	4.84	20,060	3.31	12,861.41	.0000777
4	Trade and Commerce (A_t)	126.7	23.75	1,16,000	19.12	10,922.41	.0000915
5	Transport and Communication (A_t^*)	35.2	6.60	43,900	7.24	8,018.22	.0001247
6	Other Services (A_o)	77.7	14.56	1,28,100	21.11	6,065.57	.0001648
	Total	533.5	100.00	60,6706	100.00	49,807.16	.009332

(Rs. 9,207), transport (Rs. 8,018) and 'other' services (Rs. 6,066). The lowest level of output per employed person is observed in agro-based economic activities (Rs. 2,732).

Regarding the distribution of workforce by occupation levels (Table 7.2), the highest concentration of workers is found in occupational category of craftsman and production process (39.42%) followed by workforce in transport and communication (34.21%), sales workers (18.31%). By educational leve's the highest concentration is observed in primary education (60.94%) followed by literacy level (28.10%) and secondary education (9.24%). Within each category of occupations the distribution of workers by educational level is presented in Table 7.2.

Further, the detailed distribution of workforce by different occupations and economic activities is presented in Table 7.3. It indicates that the highest level of skilled workforce is engaged in mostly in 'service' sector of the economy. Using the details of skills of workforce and production values by economic activities the pattern of productivities of different categories of skills in various economic activities is presented in Table 7.4.

4. Summing up

The co-efficients of workforce by skills (Table 7.4) can be utilised for projections of manpower by economic activities under given level of projected output and the certain assumptions as mentioned in earlier paras. Accordingly, some policy implications relating to manpower and educational planning in the city can be derived. If such study is also available for different points of time then a comparative framework and study regarding changes in sector-wise productivities of workers across skills/occupations and educational levels can be made. And, accordingly some changes in educational planning can be made for developing an effective manpower and educational planning in the city.

Table 7.2

Distribution of Workers by Occupations and Educational Levels in Ahmedabad City—1977

S. No.	Occupational Divisions	Group of S. No. as per Table 7.3	General and Professional Educational Levels			
			Literate	Primary	Metriculate	Tech. Diplo.
1	Professional, Technical and Related workers	1-11	292	1,410	726	98
2	Administrative, Executive and Managerial workers	12-15	1,709	4,362	1,637	95
3	Clerical and Related workers	16-20	4,986	17,990	14,675	168
4	Sales workers	21-25	33,291	98,854	12,562	78
5	Farmers, Fishermen, Hunters, Loggers and Related workers	26-30	3,365	5,205	211	8
6	Miners, Quarrymen and Related workers	31-34	547	1,013	85	2
7	Workers in Transport and Communication occupations	35-44	78,103	15,656	24,664	699
8	Craftmen, Production Process workers and Labourers (n.e.c.)*	45-71	1,02,376	2,01,884	9,293	556
9	Services, Sports and Recreation workers	72	20	40	2	—
10	Workers not classifiable by occupations	73-74	131	380	113	7
	Total Workforce		2,24,820	4,87,704	73,968	1,707
	%		(28.10)	(60.94)	(9.24)	(0.21)

* Not elsewhere classified

Contd.

Table 7.2 (contd.)

S. No.	Non-Tech. Diploma	Uni. Degree	Engg.	Medi.	Agri.	Veteri.	Techno.	Teaching	Others	Total	(%)
1	10	343	83	124	4	2	6	85	115	3,298	(.41)
2	14	778	82	22	29	3	8	30	219	8,984	(1.12)
3	34	2,613	—	—	25	—	—	—	431	40,922	(5.11)
4	13	1,303	30	13	6	—	14	—	392	1,46,556	(18.31)
5	2	25	—	—	22	1	—	—	34	8,873	(1.11)
6	—	—	—	—	—	—	—	—	9	1,656	(.21)
7	42	2,845	233	—	—	—	—	—	654	2,73,806	(34.21)
8	16	684	25	—	—	—	102	—	517	3,15,453	(39.42)
9	—	—	—	—	—	—	—	—	1	63	(.01)
10	2	59	—	—	—	—	—	2	6	700	(.09)
Total	133	8,450	453	159	86	6	130	117	2,378	8,00,311	(100.00)
Workforce (%)	(.02)	(1.08)	(.06)	(.02)	(.01)	(.0007)	(.02)	(.01)	(.30)	(100.00)	

Table 7.3

Distribution of Workers by Occupations and Economic Activities in Ahmedabad—1977

S. No.	Occupational Groups	Workers in different Economic Activities						Total Workers
		A_F	A_M	A_C	A_T	A_T^*	A_O	
1	Architects, Engineers and Surveyors	8	660	244	2	1	229	1,144
2	Chemists, Physicists, Geologists and other Physical Scientists	1	328	—	124	47	5	505
3	Biologists, Veterinarians, Agronomists and related Scientists	4	6	—	—	—	—	10
4	Physicians, Surgeons and Dentists	—	29	—	—	—	76	105
5	Nurses, Pharmacists and other Medical and Health Technicians	4	181	—	5	2	95	287
6	Teachers	1	78	—	—	—	45	124
7	Jurists	—	3	—	7	3	—	13

(*Contd.*)

Table 7.3 (contd.)

S. No.	Occupational Groups	Workers in different Economic Activities						Total Workers
		A_F	A_M	A_C	A_T	A_T*	A_O	
8	Social Scientists and related workers	2	132	3	64	24	156	381
9	Artists, Writers and related workers	—	210	9	7	3	26	255
10	Draughtsmen and Science and Engineering Technicians (n.e.c.)	2	233	56	—	—	168	459
11	Other Professional, Technical and related workers	—	2	5	—	—	1	15
12	Administrators and Executive Officials (Govt.)	2	3	10	3	1	9	28
13	Directors and Managers—Wholesale and Retail trade	—	3	3	912	345	—	1,263
14	Directors, Managers and Working Proprietors—Financial Institutions	—	—	—	399	151	—	550

15 Directors, Managers and Working Proprietors and others	47	4,407	1,104	36	14	1,535	7,143
16 Book-keeper and Cashiers	24	2,345	92	2,654	1,004	949	7,068
17 Stenographers and Typists	7	328	7	100	38	7,44	1,224
18 Office Machine Operators	—	72	1	10	4	69	156
19 Clerical workers miscellaneous	64	9,854	522	2,323	879	9,695	22,337
20 Unskilled Office workers	28	2,275	183	664	251	5,736	9,137
21 Working Proprietors Wholesales and Retail trade	25	26	—	68,549	25,942	5	94,547
22 Insurance and Real Estate Salesmen, Salesmen of Securities and Services and Auctioneers	—	6	1	2,728	1,033	29	3.797
23 Commercial Travellers and Manufaturers Agents	—	2,039	—	601	227	4	2,871
24 Salesmen, Shop Assissants and related workers	4	144	1	32,321	12,232	4	44,703

(*Contd.*)

Table 7.3 (contd.)

S. No.	Occupational Groups	Workers in different Economic Activities						Total Workers
		A_F	A_M	A_C	A_T	A_T*	A_O	
25	Moneylenders & Pawn-brokers	—	—	—	513	194	1	708
26	Farmers and Farm Managers	4,519	9	3	26	10	—	4,567
27	Farm workers	1,896	397	9	158	60	53	2,523
28	Hunters and related workers	3	—	—	—	—	—	3
29	Fishermen and related workers	1,112	—	—	13	5	—	1,130
30	Loggers and other Forestry workers	582	35	—	24	9	—	650
31	Miners and Quarrymen	1,350	63	7	—	—	4	1424
32	Well-Drillers and related workers	13	3	38	—	—	—	54
33	Mineral Treaters	—	3	1	—	—	—	4
34	Miners, Quarrymen and related workers	158	14	2	—	—	—	174

35 Deck officers, Engineer-officers, Pilots and Ship	2	—	—	—	—	339	341
36 Deck and Engine-Room Ratings (Ship) Byre Crews and Boatmen	—	3	2	—	—	9,389	9,394
37 Aircraft Pilots, Navigators and Flight Engineers	—	—	—	—	—	17	17
38 Drivers and Firemen —Railway Engineers	—	9	—	—	—	3,764	3,773
39 Drivers-Road Tranport	58	1,970	177	248	94	30,503	33,050
40 Conductors, Guards and Brakesmen (Railway)	—	3	25	—	—	1,153	1,181
41 Inspectors, Supervisors, Traffic Controllers and Despatchers (Transport)	—	3	—	—	—	7,906	7,909
42 Telephone, Telegraph and related Telecommunication Apparatus	—	26	—	2	1	1,90,740	19,076
43 Postmen and Messengers	—	3	227	—	—	4,719	4,949
44 Workers, in Transport and Communication Occupations (n.c.c.)	—	35	—	—	—	22,388	22,423

(*Contd.*)

Table 7.3 (contd.)

S. No.	Occupational Groups	Workers in different Economic Activities						Total Workers
		A_F	A_M	A_C	A_T	A_T*	A_O	
45	Spinners, Weavers, Knitters, Dyers and related workers	—	1,11,226	—	—	—	3	1,11,229
46	Tailors, Cutters, Furries and related workers	---	19,831	2	2	—	5	19,840
47	Leather-cutters, Lasters and Sewers (except Gilones and Governments and related workers)	—	6,043	14	—	—	—	6,057
48	Furnacemen, Rollers, Drawers, Moulders and related Metal and Treating work	—	9,110	—	—	—	559	9,669
49	Precisions, Instrument Makers, Watch makers and related workers	—	8,275	158	24	9	1	8,469
50	Tools makers, Machanists, Plumbers, Welders, Plasters and related workers	29	16,251	52	10	3	6,939	23,255
51	Electricians and Related Electrical and Electronics workers	2	1,771	372	48	18	1704	3913

52 Carpenters, Joiners, Cabinet makers, Coopers and related workers	3	14,730	771	2	1	515	16,022
53 Painters and Paper-Hangers	—	386	71	—	—	227	684
54 Brick-layers Plasters and Construction workers (n.e.c.)	21	976	11,006	2	9	42	12,056
55 Compositors, Printers, Engravers, Book-binders and related workers	—	5,743	—	5	2	3	5,753
56 Pollers, Kitnment, Glass and Clay farmers and related workers	—	8,883	3	—	—	12	8,898
57 Millers, Bakers, Brewmasters and related food beverage workers	23	10,185	—	123	47	—	10,378
58 Chemical and related workers	—	6,089	—	3	1	2	6,095
59 Tobacco Preparers and Product makers	—	9,525	—	6	2	2	9,535
60 Craftmen and Production process workers (n.e.c.)	5	3,525	—	7	3	3	3,543
61 Testers, Pakers Sorters and related workers	—	1.829	—	1,034	391	104	3,358

(*Contd.*)

Table 7.3 (concld.)

S. No.	Occupational Groups	Workers in different Economic Activities						Total Workers
		A_F	A_M	A_C	A_T	A_T^*	A_O	
62	Stationary Engines, excavating and Lifting Equipment Operators and related workers	18	2,808	152	3	1	938	3,990
63	Labourers (n.e.c.)	482	19,036	5,078	1,980	749	12,008	39,333
64	Fire fighters, Policemen, Guards and related workers	118	3,131	206	327	122	3,416	7,320
65	Housekeepers, Cooks Maids & related workers	12	230	10	20	7	92	371
66	Waitors, bartenders and related workers	—	35	—	6	2	18	61
67	Building care-takers, Cleaners and related workers	19	1,855	58	159	60	3,515	5,666
68	Barbers, Hairdressers, Beauticians and related workers	—	—	—	—	—	1	1
69	Launderers, Drycleaners and pressers	—	6	—	—	—	—	6

70 Athletes, Sportsmen and related workers	—	—	—	—	—	—	—
71 Photographers and related Camera operators	—	3	—	—	—	20	23
72 Service, Sport and Recreation workers (n.e.c.)	1	23	31	—	—	8	63
73 Workers reporting occupation unidentifiable or unclassifiable	10	570	13	20	7	75	695
74 Workers not reporting occupations	—	3	1	1	—	—	5
Total	10,607	2,88,025	20,730	1,16,275	44,008	3,20,768	8,00,311

Table 7.4

Occupation-wise Labour-Output Ratios Across Economic Activities in Ahmedabad City : 1977

S. No.	Occupational Groups	Labour-Output Ratio Across Economic Activities Output Value (Rs. 0000) (V/L)						All Activities
		A_F	A_M	A_C	A_T	A_I*	A_O	
1	Architects, Engineers and Surveyors	362.5	401.9	105.7	63,350.0	35,200.0	339.3	466.3
2	Chemists, physicists, Geologists and other Physical Scientists	2,900.0	808.5	—	1,021.7	748.9	15,540.0	1,056.4
3	Biologists, Veterinarians, Agronomists and related Scientists	725.0	44,200.8	—	—	—	—	53,350.0
4	Physicians, Surgeons and Dentists	—	9,144.8	—	—	—	1,022.4	5,080.9
5	Nurses, Pharmacists and other Medical and Health Technicians	725.0	1,465.1	—	25,340.0	17,600.0	817.1	1,858.8
6	Teachers	2,960.0	3,400 0	—	—	—	1,726.7	4,302.4
7	Jurists	—	88,400.0	—	18,100.0	11,733.3	—	41,038.4

8 Social Scientists and related workers	1,450.0	2,009.1	8,600.0	1,979.7	1,466.6	498.1	1,400.2
9 Artists, Writers and related workers	—	1,262.8	2,866.6	18,100.0	11,733.4	2,988.5	2,092.1
10 Draughtsmen, Scientists and Engineering Technicians (n.e.c.)	1,450.0	1,138.2	460.7	—	—	462.5	1,162.3
11 Other Professional, Technical and related workers	—	29,460.7	5,160.0	—	—	77,760.0	35,566.7
12 Administrators and Executive Official (Govt.)	1,450.0	88,400.9	2,580.0	42,233.3	35,200.0	8,633.4	19,053.5
13 Directors & Managers—Wholesale and Retail trade	—	88,400.0	8,600.0	138.9	102.1	—	422.4
14 Directors, Managers and Working Proprietors—Financial Institutions	—	—	—	317.5	233.1	—	970.0
15 Directors, Managers and Working Proprietors and others	61.7	60.2	23.4	3,519.4	2,514.3	50.6	94.6
16 Book-keeper and Cashiers	120.8	113.1	280.4	47.7	35.1	81.9	75.5
17 Stenographers and Typists	414.3	808.5	3,685.7	1,267.0	962.3	104.4	435.9

(*Contd.*)

Table 7.4 (contd.)

S. No.	Occupational Groups	Labuor-Output Ratio Across Economic Activities : Output Value (Rs. 0000) (V/L)						All Activities
		A_F	A_M	A_C	A_Γ	A_T*	A_O	
18	Office Machine Operators	—	3,683.3	25,800.0	12,670.0	8,800.0	1,126.1	3,556.7
19	Clerical workers miscellaneous	45.3	26.9	49.4	54.5	40.1	8.1	22.9
20	Unskilled Office workrs	103.6	116.6	140.9	190.8	140.2	13.5	275.4
21	Working Proprietors Wholesales and Retail trade	116.0	10,200.0	—	1.8	1·4	15,540.0	5.6
22	Insurance and Real Estate Salesmen, Salesmen of Securities and Services and Auctioneers	—	44,200.0	25,800.0	46.5	34.1	2,679.3	143.1
23	Commercial Travellers & Manufacturers Agents	—	130.1	—	210.8	155.1	19,425.0	185.8
24	Salesmenship Associates and related workers	2,900.0	1,841.7	25,800.0	3.9	2.9	19,425.0	11.9

25 Money lenders & Pawn-brokers	—	—	—	246.9	181.5	77,700.9	753.5
26 Farmers and Farm Managers	1.0	29,466.7	8,600.0	4,873.1	3,520.0	—	116.8
27 Farm workers	1.6	668.1	2,866.0	801.9	586.7	1,466.1	211.5
28 Hunters and related workers	966.7	—	—	—	—	—	17,783.3
29 Fishermen and related workers	2.6	—	—	9,746.2	7,040.0	—	472.1
30 Loggers and other Forestry workers	5.0	7,577.1	—	5,279.2	3,911.1	—	820.8
31 Miners and Quarrymen	2.1	4,209.5	3,685.7	—	—	19,425.0	374.4
32 Well-Drillers and related workers	233.1	88,400.0	678.9	—	—	—	9,879.6
33 Mineral Treaters	—	88,400.0	25,806.0	—	—	—	1,33,375.0
34 Miners, Quarrymen, and related workers	18.4	18,942.8	12,900.0	—	—	—	3,066.1
35 Deck officers, Engineer-officers, Pilots and Ship	1,450.0	—	—	—	—	229.2	1,564.5
36 Deck and Engine-Room Ratings (Ship) Byre Crews and Boatmen	—	88,400.0	12,900.0	—	—	8.2	56.9

(Contd.)

Table 7.4 (contd.)

S. No.	Occupational Groups	Labour-Output Ratio Across Economic Activities : Output Value (Rs. 0000) (V/L)						All Activities
		A_F	A_M	A_C	A_T	A_T*	A_O	
37	Aircraft Pilots, Navigators and Flight Engineers	—	—	—	—	—	4,570.5	31,382.3
38	Drivers and Firemen, Railway Engineers	—	29,466.7	—	—	—	20.6	141.4
39	Drivers—Road Transport	50.0	134.6	145.8	1,347.9	374.5	2.5	16.2
40	Conductors, Guards and Brakesmen (Railway)	—	88,400.0	1,032.0	—	—	67.4	451.7
41	Inspectors, Supervisors Traffic Controllers and Despatchers (Transport)	—	88,400.0	—	—	—	9.8	67.5
42	Telephone, Telegraph and related Telecommunication Operators	—	10,200.0	—	1,26,700.0	35,200.0	0.5	2.8
43	Postmen and Messengers	—	88,400.0	113.9	—	—	16.5	107.8

44 Workers in Transport and Communication Occupations (n.e.c.)	—	7,577.1	—	—	—	3.5	370.0
45 Spinners, Weavers, Knitters, Dyers and related workers	—	2.4	—	—	—	25,900.0	4.8
46 Tailors, Cutters, Furries and related workers	—	13.4	12,900.0	—	—	15,540.0	26.9
47 Leather-cutters, Lasters and Sewers (except Gilones and Governments and related workers)	—	43.9	1,842.9	—	—	—	88.7
48 Furnacemen, Rollers, Drawers, Moulders and related Metal and Treating work	2,900.0	29.2	—	—	—	138.9	55.2
49 Precisions, Instrument Makers, Watch makers and related workers	—	32.1	165.3	14,077.8	3,911.1	77,700.0	63.1
50 Tools makers, Machinists, Plumbers, Welders, Plasters and related workers	100.0	16.3	496.2	42,233.3	11,733.3	11.2	22.9
51 Electricians and Related Electrical and Electronics workers	1,450.0	149.7	69.3	7,038.9	1955.6	45.6	136.4
52 Carpenters, Joiners, Cabinet makers Coopers and related workers	966.7	18.1	33.5	63,350.0	35,200.0	150.0	33.9

(*Contd.*)

Table 7.4 (contd.)

S. No.	Occupational Groups	Labour-Output Ratio Across Economic Activities : Output Value (Rs. 0000) (V/L)						All Activities
		A_F	A_M	A_C	A_T	A_T^*	A_O	
53	Painters and Paper-Hangers	—	687.1	363.4	—	—	342.3	779.9
54	Brick-layers, Plasters and Construction workers (n.e.c.)	138.1	71.7	2.4	63,330.0	3,911.1	1,850.0	44.3
55	Compositors, Printers, Engravers, Book-binders and related workers	—	46.2	—	25,340.0	17,600.0	25,900.0	92.8
56	Pollers, Kitnment, Glass and Clay farmers and related workers	—	29.9	8.000	—	—	6,475.0	59.9
57	Millers, Bakers, Brewmasters and related food beverage workers	126.1	26.1	—	1,030.1	748.9	—	57.4
58	Chemical and related workers	—	43.6	—	42,233.3	35,200.0	38,850.0	87.5
59	Tobacco Preparers and Product makers	—	27.9	—	21,116.7	17,600.0	38,850.0	55.9
60	Craftmen and Production process workers (n.e.c.)	580.0	82.2	—	18,100.0	16,733.3	25,900.0	150.6

61 Testers, Pakers, Sorters and related workers	—	144.9	—	122.5	90·1	747.2	158.9
62 Stationary Engines, excavating & Lifting Equipment Operators and related workers	161.1	94.4	169.7	42,223.4	35,200.0	82.8	136.1
63 Labourers (n.e.c.)	6.1	13.9	5.1	63.9	46.9	6.5	13.6
64 Fire-fighters, Policemen, Guards & relate workers	24.6	84.7	125.3	387.5	288.6	22.8	72.9
65 Housekeepers, Cooks, Maids & related workers	241.7	1,153.1	2,580.0	6,335.0	5,028.6	844.6	1438.1
66 Waitors, bartenders and related workers	—	7,577.2	—	21,116.7	17,600.0	4,316.7	8743.9
67 Building care-takers, Cleaners and related workers	152.7	142.9	444.9	790.8	586.7	22.2	94.2
68 Barbers, Hairdressers, Beauticians and retated workers	—	—	—	—	—	77,700.0	5,33,500.0
69 Launderers, Drycleaners and pressers	—	44,200.0	—	—	—	—	88,916.7
70 Athletes, Sportsmen and related workers	—	—	—	—	—	—	—

(Contd.)

Table 7.4 (concld.)

S. No.	Occupational Groups	Labour-Output Ratio Across Economic Activities : Output Value (Rs. 0000) (V/L)						All Activities
		A_F	A_M	A_C	A_T	A_T*	A_O	
71	Photographers and related Camera Operators	—	88,400.0	—	—	—	3,885.0	23,195.7
72	Service, Sport and Recreation workers (n.e.c.)	2,900.0	11,530.4	832.3	—	—	9,712.5	6,468.3
73	Workers reporting occupation unidentifiable or unclassifiable	290.0	465.3	1,989.6	6,335.0	5,026.6	1,036.0	769.7
74	Workers not reporting occupations	—	88,400.0	25,800.0	1,26,700.0	—	—	1,06,700.0

8

Conclusions : An Overall Policy View

Education is an important factor in creating social order founded on the values of socio-economic justice, freedom and equal opportunity and thereby accelerating economic development and technological progress. Due to such recognition to education, some underlined attempts have been made on various aspects of education by various individual researchers, committees and commissions in India.

Some impressive achievements have been made in education during the plan era of 35 years. The enrolments in schools and higher education have gone-up by four and ten times respectively. The enrolments at primary, secondary and higher education have increased at the annual rates of 6.5 per cent, 8.5 per cent and 10.1 per cent respectively. The corresponding educational institutions have expanded at the annual rates of 3.7 per cent, 10.9 per cent and 6.3 per cent. For this expansion the expenditure has increased at the rate of 12.8 per cent. The per capita educational expenditure has increased at the rate of 5.1 per cent.

A close look, however, reveals that the existing situation is far from satisfactory. More than half population is still illiterate. Adult education is far from its targets. The goal of a universal primary education has not been attained. Education of girls has been lagging behind that of boys at each educational level. This disparity is more glaring in the case of weaker sections particularly scheduled castes and scheduled tribes and rural areas especially in the case of smaller villages. Wastage of resources due to drop-out and stagnation still continues at a very high rate, particularly among the females, rural areas and scheduled castes and tribes. Unemployment among educated persons has been increasing constantly.

In the absence of adequate and consistent information, it is quite difficult to sketch a real picture of prevailing education system or development. Weaknesses are noted about estimates of literates, enrolments, cost, demand for and supply of manpower, etc. which have serious implications. Moreover, there are also wide differences between the period for completing a particular educational level across States. There are also considerable differences in per student Government expenditure, financial assistance and institutional role at a particular educational level across the states. Such inequalities discriminations and are quite unfair for healthy development of education in the country.

It is recognised that the education is an important factor for private returns and; result of that is a constant upliftment of the economic situation and social justice. *But in private returns only a small proportion of the community is able to proceed with higher education for one reason or another.* Moreover, if education is expanded, average private returns tend to be lower than expected, particularly under the situation of increasing unemployment. The deliberate concentration on expansion of education based on a high rate of private returns has also failed to clarify the basic connection between education and economic development.

The specific purpose of development always demands specific education. Some results of correlation between marginal (differences in) educational effort and the marginal economic growth rate are worked out. Particularly, (*i*) Education in medical science, technology, agriculture and applied engineering science is significantly related to gross national product (0.69); (*ii*) Education in commerce, business, economics, political science, public administration, social welfare, sociology and statistics is also significantly related to gross national product (0.62); (*iii*) Education in arts, music, fine arts, literature, languages and history is not significantly related to the gross national product (0.16); and (*iv*) Education in pure science *i.e.* in astronomy, biology, chemistry, physics, zoology and mathematics is also not significantly related to the gross national product (0.08). It may be due to the fact that first two groups of education are directly related to various decision makings while latter two are not or indirectly. The country like India whose education system is stressed much on the humanities must have to bear an opportunity cost—in terms of a low rate of economic growth and sooner or later the humanists themselves will suffer. Therefore, education system must be stressed in view of a material progress, relatively more effective investment and growth promoting policy rather than just in "background". *Thus advocacy of ratio of educational expenditure to national expenditure to national income is less important as compared to the ratio of resources made available for required types of education to national income.*

It is well-known that quality of education at each level is constantly declining and present education system cannot fulfil the requirements of the development. A genuine reason may be lower level of average teacher's salary. The average salary of teacher (and its growth also) with particular educational level is lower than that of a person with same educational level in different other occupation or economic activities. *Thus present education system has no magnitude power to attract the most qualified persons for teaching. Then how poor quality of teachers can formulate and adopt the effective education system either by reforms in examination, teaching or internal assessment?*

Imbalaces between demand for and supply of educated and skilled manpower are also prevailing at a large extent. Various assumptions related to the base year estimates of surplus, growth of output, changes in the structure of output capital technology and certain norms in demand and supply aspects have not been correctly analysed. *Manpower supply and demand have been left on the classic system of "supply creates its own demand" or competitive system of supply market and monopolistic situation of demand market. As a result, unemployment among educated persons has been increasing constantly and* *shortage of manpower is left in a few skills. Thus, policy of expansion of higher education based on non-economic considerations must be reviewed thoroughly.*

Question is that further expansion of education should go up or not ? Actually it should be based on (*i*) returns of education to the economy, and (*ii*) requirements of skilled and educated manpower to the economy. In case of returns, it is estimated that annual contribution of the primary education over literacy is 15 per cent; of the middle school education over primary education is 14 per cent; of the secondary education over middle is 10.5 per cent; and of the higher education over secondary education is 9 per cent. If the prevailing interest rate (10 to 11 per cent per annum) is considered then the higher education is not profitable. Moreover, due to continuous over supply of educated manpower, economic value to education is constantly declining. The cost position of education reveals that average annual cost of one under-graduate of science or arts is equal to 22 students in primary education; one post-graduate in arts is equal to 41 students in primary education and; one post-graduate in science is equal to 89 students in primary education. *Thus, allocation of resources in education should not be blindly adopted.*

The wastage of resources is not only due to expansion of wrong types of education but also due to high rate of drop-out and stagnation (65.3%). It is much higher in rural areas, females and weaker sections of the society particularly scheduled castes and tribes as compared to the urban areas, males and non-weaker sections of society. The wastage of resources in education is estimated to 27.6 per cent.

A major presumption of the war on poverty and inequality is that education and training are effective ways to bring people out of them. But it is not necessary that expenditure on education can automatically raise the income level of poor class. *It is observed that the affluent class (holding land/asset and upper caste) has been constantly getting higher education and returns from it. The children of the illiterate poor parents are clearly at disadvanage.* The reasons like distance between the residence and the schools in rural areas, household work and compulsion to supplement family income, inhibit the parents in sending their children to schools. The Government's financial assistance and other facilities have also not reached to the poor people in desired manner. Therefore, some wide and special efforts through expansions of direct productive activities and social overhead capital are also required to raise the living standard of poor people.

In view of above-mentioned facts, wide range efforts as made in this study must be considered for developing effective educational planning, especially (*i*) within the education system, what should be the priorities according to the different stages and sectors of the economy ? (*ii*) what should be the priorities for the types of educational institutions on the bssis of demand for the specific education required for specific purposes ? (*iii*) what should be the optimum investment pattern between formal and informal education as compared to investment in other sectors of the economy ? (*iv*) what should be the principles or criteria for the grants given by the government to different educational institutions ? (*v*) how can the internal efficiency of the educational system be increased; minimising the economic wastage by reducing the drop-out rate, stagnation period, raising quality of teching etc. (*vi*) how to make a chioce between expansion of the educational facilities to meet the demands of the less privilegd society and children coming from backward areas ? and (*vii*) how can the surplus and shortages in labour market be corrected ?

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